the OIL AND GAS JOURNAL

power
pays off
in drilling

BJ

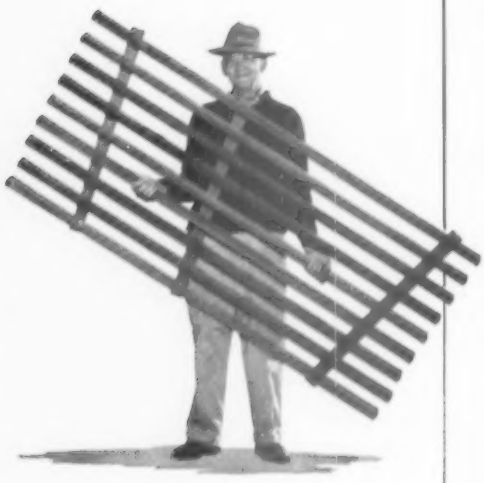
POWER TONG

POWER SLIPS

Tools of our Trade No. 4

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 AUGUST 30, 1954

Examine the filling of a
FLUOR COOLING TOWER
and get the whole story



Fluor uses only 100% clear all heart redwood for filling

Fluor grid decks are not only sturdily built but are made from the highest grade redwood lumber—100% clear all heart redwood—the finest cut of the log. Clear all heart redwood is free from defects and sapwood and under normal controlled water conditions will give many many years of trouble-free service. We invite you to investigate our filling before making your selection of a cooling tower.

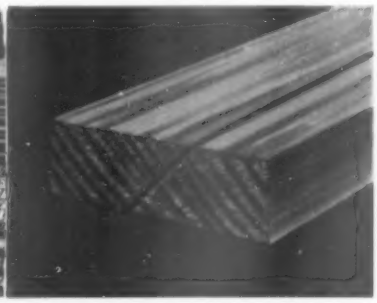
On an average, the price of a cooling tower is based 30% on the mechanical equipment and about 70% for lumber and fabrication. For example, in a Cooling Tower costing $200,000, the mechanical equipment will amount to approximately $60,000 and the tower structure about $140,000. Of this $140,000 about 30% (or $42,000) consists of the filling (grid decks) inside the tower which breaks up the water for greater exposure to air.

The filling is in reality the heart of the tower and its design and construction is of utmost importance. All Fluor Tower filling is mill cut and assembled into grid panels, 2 ft. 10″ wide x 5 ft. 11½″ long. Nine bars are nailed (with 6 penny copper nails) to three 1x2 cross cleats. The bars are cut on a 25% bevel from 1 x 3 boards; each bar averages 1″ x 1½″. Grid panels are strong enough to support three 200 lb. men and are actually used as scaffolding during tower erection and inspection. You get more years from a tower with this kind of filling.

Write for illustrated bulletin "Cooling Water for Industry."

Grid decks easily support three 200 lb. men

Grid decks serve as scaffolding during erection



A 1x3 makes two bars for Fluor grid decks

BE SURE WITH

FLUOR

THE FLUOR CORPORATION, LTD
LOS ANGELES 22, CALIFORNIA
FLUOR OF CANADA - TORONTO
FLUOR PERUANA, S.A. - LIMA
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MANUFACTURERS

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CHICAGO
PHILADELPHIA
BOSTON
PITTSBURGH
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BIRMINGHAM
TULSA

the OIL AND GAS JOURNAL

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In Brief . . .

1. GEOPHYSICAL PROBLEM . . . One of the major problems confronting geologists in southern Texas areas is the ability to record usable seismic reflection data. Use of improved techniques such as: (1) multiple holes; (2) multiple geophones; (3) long in-line offsets; (4) right-angle offsets; (5) surface shooting, and (6) variable seismic play-back units, has helped to solve these difficult areas.

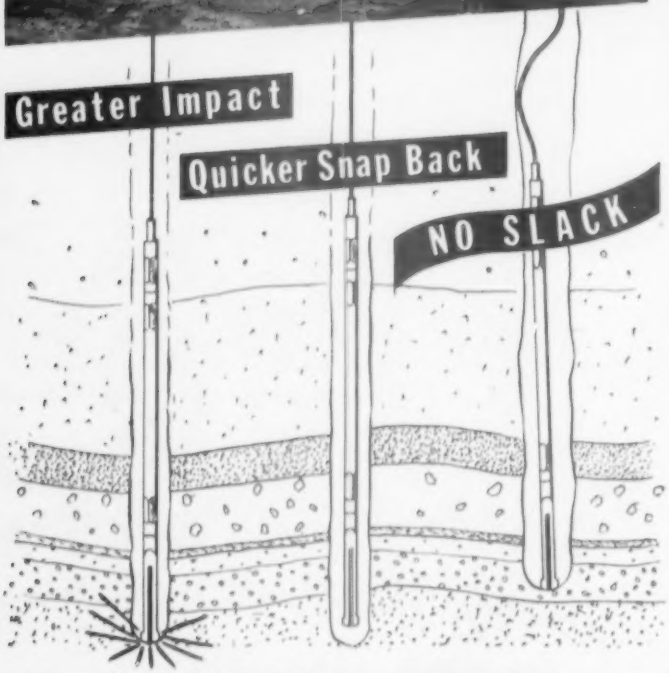
2. CONTINUOUS GRAVITY MEASUREMENT . . . Direct and continuous measurement of product gravity by radiation methods is successful on a products pipeline of Trans-Northern. Measurement is by a new instrument, the Density Gammagage which measures gravity of the contents of the pipeline or tank by the absorption of a gamma-ray beam from a radioactive source.

3. UPGRADING QUALITY . . . The natural petroleum distillates can be upgraded by Unifining in these respects: (1) over 90 per cent of the sulfur present is removed; (2) color and stability of cycle oils and thermal distillates are improved; and (3) Unifining light oils increases gasoline yield on subsequent catalytic cracking.

4. GIVE YOUR BOSS A BREAK . . . Always let your boss know what you are doing—see that he is not surprised about the details and responsibilities which have been assigned to you. In keeping him informed (1) get all the necessary facts; (2) distinguish between facts and conclusions; (3) submit recommendations, and (4) have an alternative plan.

5. EFFICIENT PRODUCTION . . . After a well in Midway field in San Patricio County was put on one-point-injection gas lift, oil production increased by 32.9 per cent. This increase was accomplished by utilizing more efficiently the available horsepower and discharge pressure of existing gas-lift facilities.

the NEW SPUDDING ACTION ... that Revolutionized Cable-Tool Drilling



Watch a Walker-Neer Spudder make hole, and you won't settle for any other spudder. V-belt driven spudding beams "get out from under the tools" faster. The tools hit harder, snap back quicker. Walker-Neer's exclusive Tor-Shock (Rubber Torsion) Shock Absorber is absolutely without equal. It provides the snappiest spudding action in the field, plus . . . that unbelievably smooth, quiet drilling motion that has amazed the cable-tool industry.

Note: The Tor-Shock Shock Absorber enables steady tension on the line . . . prevents slack-and-jerk . . . gives faster strokes and prolongs rope life.

Models range from 500-foot to 10,000-foot drilling capacity, and up to 14,000-foot workover capacity.

You're YEARS AHEAD with a WALKER-NEER

WALKER-NEER

MANUFACTURING COMPANY, INC.

P. O. BOX 2490 WICHITA FALLS, TEXAS

WALKER-NEER SPUDDERS AROUND THE WORLD

DISTRIBUTORS: Oil Well Supply Company • Bovaird Supply Company • Jones & Laughlin Supply Company • Mountain Iron and Supply Company • E. D. Taylor Company • Acme Well Supply (exclusive export agent except on North American Continent)

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Mud pump hose tough all over; tube would outwear steel

COVER, tube, reinforcements—all have been improved by B. F. Goodrich to build a mud pump suction hose to take more rough wear than any hose you've ever used.

Smooth, tough tube—B. F. Goodrich mud pump suction hose has an oil-proof tube especially developed by B. F. Goodrich to give high abrasion resistance. It's so tough it actually outwears steel in many applications. Tube is smooth so mud flows through at high speed.

Roughneck cover—It's practically abrasion-proof. Move it from job to job, drag it into position, load it into a truck—but be sure it's B. F. Goodrich hose with its extra-tough cover for extra-hard service.

Takes your highest vacuum—B. F. Goodrich mud pump hose will take the highest vacuum pressures used in mud pump work. Heavy spring steel wire spiral-wrapped and imbedded in rubber prevents collapse, keeps rig drilling without costly repairs.

Cords cushioned in rubber—This hose is reinforced with four to six plies of cord—held together and cushioned by rubber that surrounds each individual cord. No cross threads. Hose is more flexible to help dampen vibration, yet stronger to resist crushing and kinking.

Should your local supplier be temporarily out of stock when you call, you can get B. F. Goodrich mud pump hose any time—day or night—from one of these B. F. Goodrich warehouses: Beaumont, Dallas, Fort Worth, Hobbs, Houston, Odessa, Wichita Falls, Great Bend, Oklahoma City, New Orleans, Tulsa, Williston, Denver and Los Angeles. *The B. F. Goodrich Company, Dept. M-303, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

For your shallow and medium-deep production . . .

select a Witte Engine . . .

because

Witte Model "C8C", Gas-Gasoline Engine Rated from 7 hp @ 350 rpm to 15.5 hp @ 750 rpm
Witte Model "5RC", Gas-Gasoline Engine Rated from 4.5 hp @ 400 rpm to 9.7 hp @ 900 rpm
Witte Model "9SRC", Gas-Gasoline Engine Rated from 4 hp @ 500 rpm to 9 hp @ 1,200 rpm

WITTE ENGINES are of extra strong construction to provide the 24-hour-a-day *dependable operation* necessary to maintain your production schedule.

WITTE ENGINES have these *design features* for long operating life: (1) condenser cooling; (2) renewable wet-type cylinder liner; (3) vital engine parts fully protected by dust-proof design; (4) replaceable valve-seat inserts and valve guides; and (5) shim adjustable tapered roller bearings.

WITTE ENGINES are available *at your regular supply store*, so you are never far from Witte Sales and Service.

Get all the facts about Witte Oil Field Engines and Engine Generator Units by writing for Booklet W22-54 or ask your nearest supply store.

WITTE ENGINE WORKS
OIL WELL SUPPLY DIVISION, UNITED STATES STEEL CORPORATION
Kansas City 26, Missouri

USS

Gas-gasoline models from 4 to 15.5 hp.

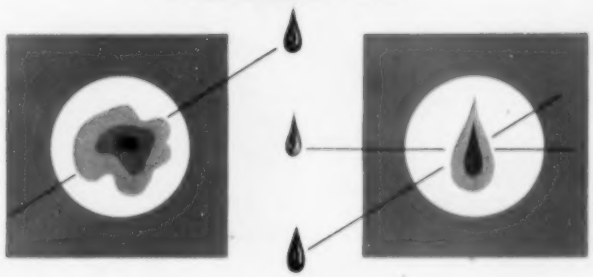
Full diesel models from 3.75 to 12.5 hp.

WITTE ENGINES

UNITED STATES STEEL

BREAKS DOWN BLOCKS TO FREE PRODUCTION

HALLIBURTON'S *DOUBLE ACTION* MCA



Two separate actions are required to effectively clear the water-oil emulsions and water-mud blocks that can shut off the free flow of normal production. Now, MCA, Halliburton's exclusive Mud Cleanout Agent, has the double action required for opening the way to increased permeability and greater production.

Here's how the two effective agents in MCA work against the drilling mud and bentonitic blocks that clog normal flow. First, hydrochloric acid shrinks the bentonite and attacks filter cake. Then, Morflo, the highly active surfactant, disperses the shrunken bentonite particles and softens the filter cake so it will remain in fluid suspension for easy removal.

Strictly mechanical processes can't do the job. And ordinary acids do only half the work. But double action MCA, with the exclusive combination of an effective acid and a surfactant, has the power to unlock water-oil and water-mud emulsions for free flow.

First proved in research laboratories to be twice as effective as acid alone, MCA has demonstrated in the field a remarkable ability to remove lost drilling muds and other flow-choking blocks. On old and new wells, you'll find MCA a valuable key to opening plugged pay zones for free, full production. Call your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

These tests on bentonite-contaminated sands that were hydrated with water established the ability of MCA over acid to increase oil flow.

BENTONITE IN SAND	TREATING AGENT	INCREASE IN OIL FLOW
10%	Dilute HCl	300%
10%	MCA	667%
20%	Dilute HCl	1,538%
20%	MCA	3,450%

Reflooding the MCA-treated sands did not decrease, but actually gave a slight increase in flow.

HALLIBURTON

CHEMICAL SERVICES

PERPETUAL PROGRESS IN PRODUCTION IMPROVEMENT TECHNIQUES

The Oil and Gas Journal, published Mondays, copyright 1954, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U.S. and foreign rates to the petroleum industry, $4 yearly.

DIGGING 4800 FEET OF DITCH

R. H. Fulton & Co., Lubbock, Tex., knows it can keep the ditch ahead of the pipe. The heart of its Cleveland ditcher is a steady, dependable CAT* D8800 Diesel Engine. On its performance depends the progress of the Fulton spread.

The 6′ x 42″ ditch is part of a loop line from Dumas, Tex., to Knowles, Okla., for Northern Natural Gas Co. In the picture the ditcher is in the process of digging 4800 feet in 7½ hours.

"We never think about being down because of engine trouble," reports Albert Jones, ditch foreman. "This is the only ditcher on the job and it has to go. It has 3500 hours and still doesn't use oil between changes."

Where trouble can be costly, pipeline men rely on Caterpillar Diesel Engines. They know these hard-working diesels are prepared for rough going with a complete system of filters, seals and air cleaners.

Lube oil is filtered before entering the engine by filters that can remove particles as small as 39-millionths of an inch. Air gets an oil bath which removes more than 99 per cent of the impurities. And fuel filters through a special group of cotton yarn elements. In addition, the engine is protected by seals designed to hold in lubrication and keep out dirt.

Dust is an engine's worst enemy in pipelaying. But with Caterpillar Engines, dust gets nowhere and you make plenty of mileage!

Ask your Caterpillar Dealer to show you the engines tailored to meet your requirements. They come in 12 sizes up to 500 HP. And be sure to specify Caterpillar Diesels when you repower or buy new equipment. Leading manufacturers of excavators, ditchers, air compressors and other equipment can supply them.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

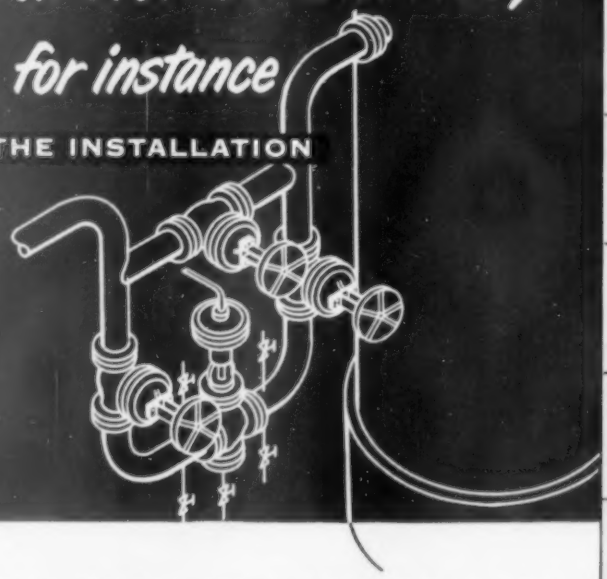
CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

SPECIFY CAT POWER FOR HIGH-PROFIT PERFORMANCE

You Can Measure this Valve's Quality on Hot Oil Service, for instance

THE INSTALLATION



In a leading lube oil plant on the Gulf Coast, using Crane Steel Valves on hot oil extraction lines from tower in Duo-Sol unit. Working pressure 100 psi at 850 degrees F.

VALVE SERVICE RATINGS

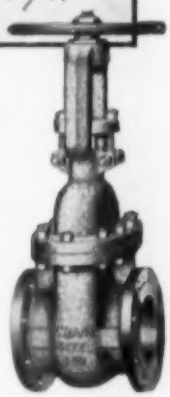
SUITABILITY:	Couldn't be better
FEATURES:	Exelloy trim
MAINTENANCE COST:	Routine service only
SERVICE LIFE:	No efficiency loss since 1951
OPERATING RESULTS:	Safe, dependable control
AVAILABILITY:	Catalog items — No. 47X

THE CASE HISTORY

Valves formerly used here were identical in design and appearance with their Crane replacements. But the similarity ended there. For they gave continual trouble in this round-the-clock process. Sticking discs made them extremely difficult to operate. They failed to hold tight on closure. Their replacement became mandatory for efficient operation.

It's been a different story since Crane 47X steel gates were installed almost 2 years ago. No more sticking of discs . . . no leakage anywhere . . . and with only routine maintenance.

THE VALVE



Work horse of the petroleum industry—Crane 150-pound steel gates—with exceptional performance assured by Crane quality design . . . Crane metallurgy . . . and the high adaptability of Crane Exelloy trim for oil and oil vapor services. Sizes 2 to 24 in.; screwed, flanged, welding ends. See your Crane Catalog or Crane Representative.

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES · FITTINGS · PIPE · PLUMBING · HEATING

TIE YOUR DERRICK TO A SPRINGKORE LINE!

SpringKore is the rotary drilling line of tomorrow! The new principle of a spring center creates and deserves confidence. It resists crushing and contends more successfully with loads, speeds, and well conditions that punish other lines.

When a section of this new line is finally worn out in service, that lubricant-packed spring center is just as round and lively as ever.

It's a lucky crew that drills with a SpringKore Rotary Line.

PESA
PARTNERS IN PETROLEUM PROGRESS

J&L STEEL

Jones & Laughlin
STEEL CORPORATION
SUPPLY DIVISION – TULSA, OKLAHOMA
Serving The United States and Canada

3400 SERIES
swing joints

YOU CAN ALWAYS DEPEND ON . . . . .

for unlimited flow line flexibility, greater load carrying capacity!

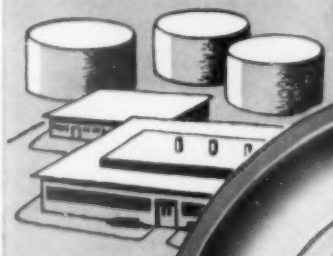
The high standard of OPW's Swing Joint performance results from expert designing, precision machining, exclusion of contamination, simple lubrication requirements, soundness of load carrying principle and perfect alignment at all times.

RAILROADS

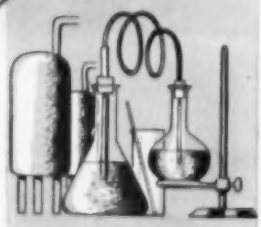
AVIATION

FOOD PROCESSING

OIL REFINING AND MARKETING



CHEMICALS



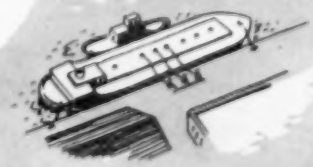
A wide range of styles and sizes makes possible many and varied applications for safely handling liquids of diversified viscosity at required temperatures and working pressures.

Exhaustive field research has directed OPW in planning a complete line of Swing Joints to fit all requirements.

NO. 4400 Series (STEEL)—Many Styles and Sizes are identical to No. 3400 Series Swing Joints. Write for Catalog F-8 for application, construction details, and engineering data.

OIL DRILLING

BARGE LOADING



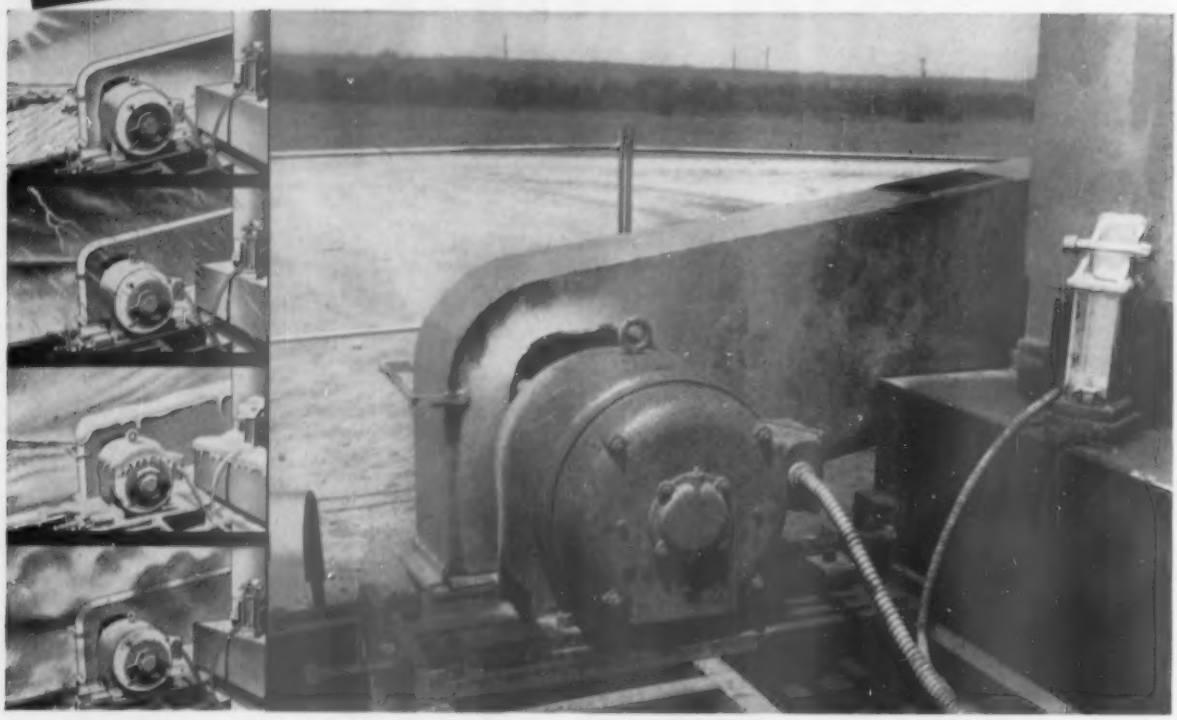
OPW CORPORATION FOR HANDLING HAZARDOUS LIQUIDS
OPW
VALVES · FITTINGS · ASSEMBLIES
CINCINNATI 25, OHIO

OPW CORPORATION

2731 Colerain Ave.
Cincinnati 25, Ohio

Wagner®
ELECTRIC MOTORS
...the choice of leaders in industry

Wagner
OIL WELL PUMPING MOTORS
built to give continuous all-weather service



Wagner 25 hp splash-proof motor installed on a hydraulic long stroke pumping unit in Scurry County, Texas.

Oil well pumping rigs need motors with the stamina to stand up under continuous all-weather operation. They must operate dependably, without attention—under a blazing sun—in driving rain—in freezing weather—or in sand and dust storms.

The Wagner line of drip-proof 40° C motors, built for oil well pumping applications, are especially designed for continuous outdoor service. They are enclosed in cast-iron frames with double end ventilation. Baffles inside the endplates retard the entrance of water, yet direct a cooling flow of air around the stator iron and windings. The windings are specially treated for outdoor service and the conduit box is moisture-proof and dust tight. These motors are available in ratings through 75 hp and are built in three electrical types: normal torque and high torque, normal slip; and high torque, high slip.

In addition to these drip-proof motors, the Wagner line includes splash-proof motors for additional protection, if desired. For applications requiring single-phase motors, Wagner can furnish high power factor type capacitor start—capacitor run motors with the same enclosures. The line also includes totally-enclosed fan-cooled motors in standard or explosion proof types for use in pumping stations and refineries.

Write for Bulletin MU-137 on Oil Well Pumping Motors and Bulletin MU-132 on Totally-Enclosed Cast Iron Motors. Thirty-two branch offices are ready to assist you in any motor application problem.

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6389 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

M54-10

INDIVIDUAL SEATING in the new AERO Commander 560

Reclining individual chairs adjust fore and aft providing maximum personal comfort for the occupant.

Individual Seating

is one of the many comfort advantages in the new Aero Commander 560.

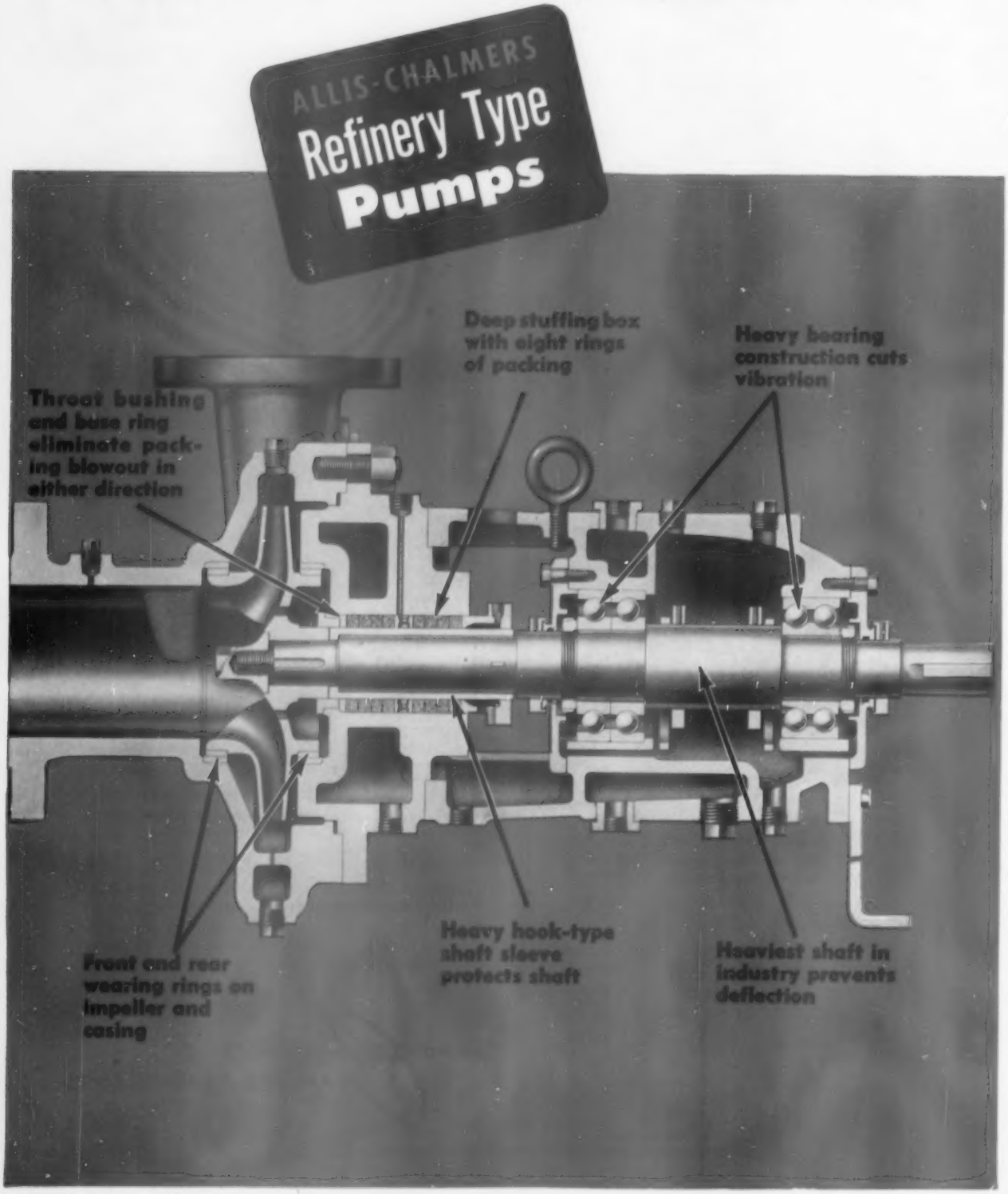
Each of the six passengers enjoys by-the-window seating, while a center aisle permits passengers to move about during flight in this 5-7 place twin-engine executive airplane.

WRITE
DEPT. 120
FOR NEW
CATALOGUE

AERO DESIGN Commander 560

AERO DESIGN AND ENGINEERING COMPANY • TULAKES AIRPORT, P. O. BOX 118 • BETHANY, OKLAHOMA

EXTRA heavy-duty construction


ALLIS-CHALMERS
Refinery Type
Pumps
Deep stuffing box with eight rings of packing
Heavy bearing construction cuts vibration
Throat bushing and base ring eliminate packing blowout in either direction
Heavy hook-type shaft sleeve protects shaft
Heaviest shaft in industry prevents deflection
Front and rear wearing rings on impeller and casing

gives you service continuity

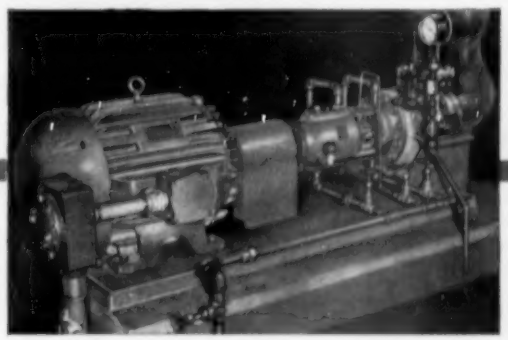
WHERE A STOPPAGE COSTS A FORTUNE, install Allis-Chalmers Refinery Pumps. These pumps have the stamina to keep going on the toughest applications for years without rest. Every construction detail, those shown here and many others, has been carefully engineered to provide ample reserves of strength and durability. Careful workmanship and expert application engineering make these pumps deliver all the reliability that is designed into them.

Wide Choice of Materials, Features

The Allis-Chalmers Refinery Pump can be fitted to suit your requirements exactly. Practically any material normally used in pumps may be specified. Stuffing box takes packing, mechanical seal or both. Cooling water or oil may be used in five separate places so you can select exactly the cooling arrangement for your particular needs. Suction may be at top or on end.

Get Complete Information and Engineering Help

Your nearby Allis-Chalmers representative will be glad to help you with your refinery pump problems. Or write for Bulletin 52B7775. Allis-Chalmers, Milwaukee 1, Wisconsin.



Save Engineering and Installation Time with an Allis-Chalmers Pump Package

Allis-Chalmers will supply a complete pumping unit — pump, motor and control — engineered to work together and with pump and motor mounted on a single base plate ready for installation. You save engineering time because you don't have to match components from different manufacturers. You save installation time because the unit comes to you already assembled. And, most important, you are sure that the components will work together to give you long life at low operating cost. The complete unit is covered by a single guarantee backed by Allis-Chalmers well-known customer satisfaction policy.

A-4333

ALLIS-CHALMERS

Maloney-Crawford VERTICOLD Provides Benefit of COLD SEPARATION at LOW INITIAL INVESTMENT

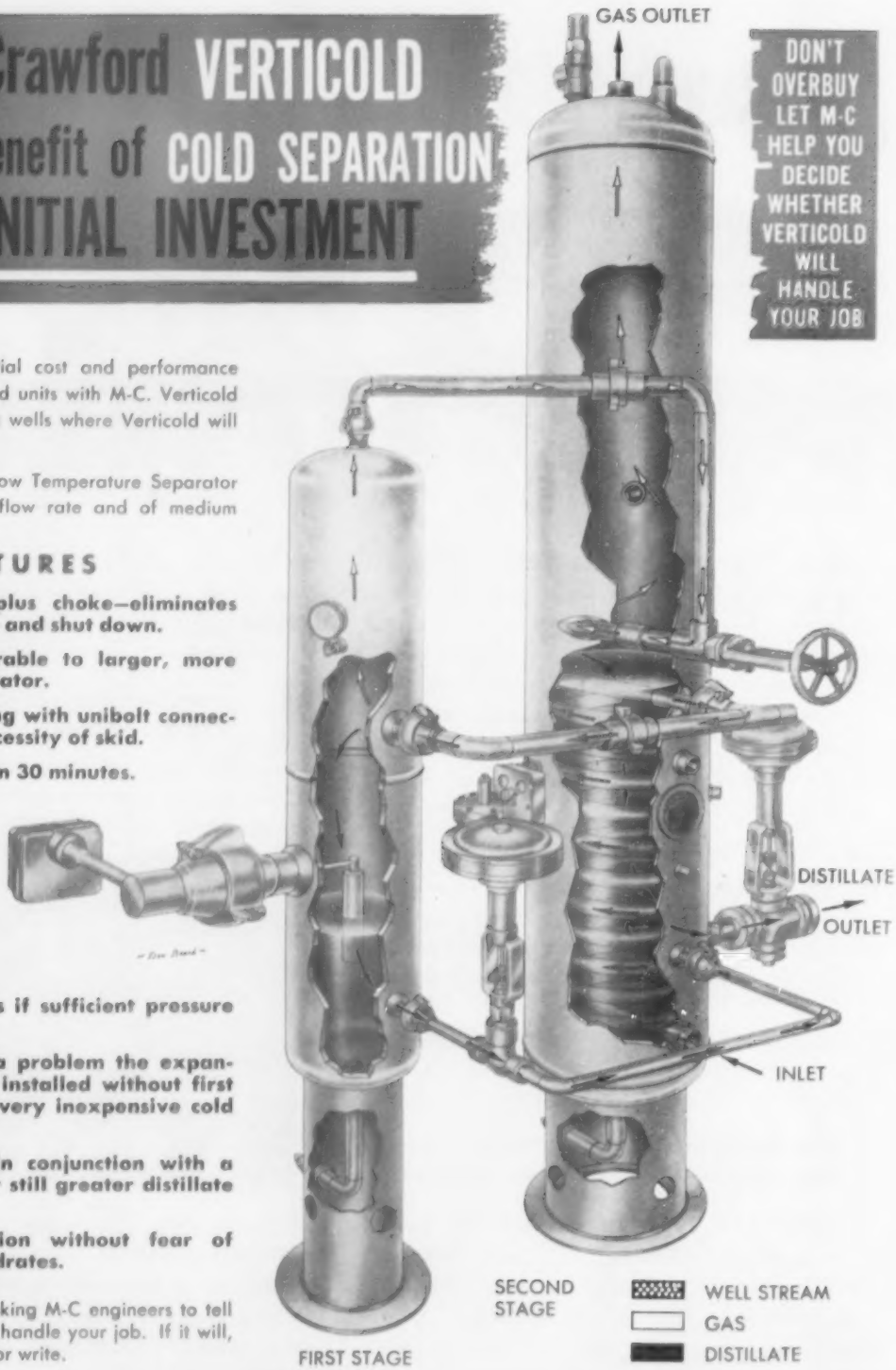
DON'T OVERBUY LET M-C HELP YOU DECIDE WHETHER VERTICOLD WILL HANDLE YOUR JOB

You get economy in initial cost and performance equivalent to higher priced units with M-C. Verticold Cold Separation Units—on wells where Verticold will handle the job.

Verticold is a simplified Low Temperature Separator ideal for wells of small flow rate and of medium pressure.

FEATURES

- ★ **Only 2 controls plus choke—eliminates costly maintenance and shut down.**
- ★ **Recoveries comparable to larger, more complex cold separator.**
- ★ **Prefabricated piping with unibolt connections eliminates necessity of skid.**
- ★ **Can be hooked up in 30 minutes.**



- ★ **Will dehydrate gas if sufficient pressure drop available.**
- ★ **If free water not a problem the expansion vessel can be installed without first stage—resulting in very inexpensive cold separator.**
- ★ **Can be installed in conjunction with a heat exchanger for still greater distillate recovery.**
- ★ **Continuous operation without fear of freezing, due to hydrates.**

There's no obligation in asking M-C engineers to tell you whether Verticold will handle your job. If it will, you'll save money. Phone or write.

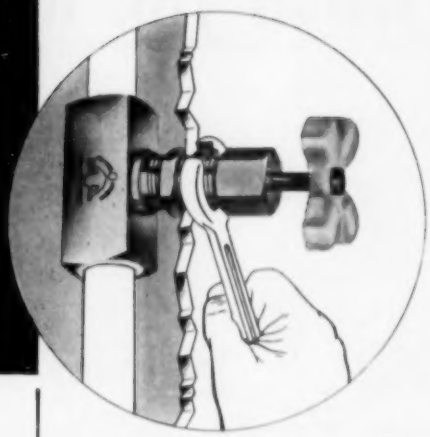
MALONEY CRAWFORD

MALONEY-CRAWFORD TANK & MFG. CO.

FACTORY AND GENERAL OFFICE: 38 North Peoria, Box 659, Tulsa, Oklahoma.
EXPORT REPRESENTATIVE: Baird Lines, 420 Lexington Avenue, New York, N. Y.
CANADIAN REPRESENTATIVE: Maloney-Crawford Tank & Service Company, Ltd., Edmonton.
TEXAS PANHANDLE REPRESENTATIVE: Atlas Tank Company, Pampa, Texas.

For panel mounting with double female connections.

For panel mounting with male inlet; female outlet.



A quick, trim panel mounting with a twist of a wrench.

Panel mounted in seconds!

Did you know that the best needle valve is also best for panel mounting?

Look at the valves above . . . specifically designed for panel mounting. No holding fixtures are needed. Simply remove the packing nut and one of the holding nuts; slip the stem through the panel opening and reassemble. The valve handle is packed separately to speed up the job — literally done in seconds.

You get a neater installation at lower cost . . . just one more proof that we have thought of everything in the Marsh 1900 series. Note the unduplicated features opposite. Ask for Needle Valve Catalog covering all details.

MARSH INSTRUMENT CO., *Sales affiliate of Jas. P. Marsh Corporation*
Dept. L, Skokie, Ill.
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas

MARSH *Needle Valves*

MARSH

The ultimate in Needle Throttling Valves

All Marsh Needle Valves — for both panel and standard mounting — share these features that are combined in no other valves.

- **Maximum working pressure: 10,000 psi** — for water, oil, or gas. Equally effective in lower pressure ranges.
- **One piece.** Body and stem-guide are fused into one piece by Marsh "Conoweld" process. No danger of stem leaking or blowing out.
- **Precision machined and ground stem** —of 416 stainless steel. Easier to operate at higher pressures.
- **Finer regulation**—provided by long fine stem threads which also give added strength.
- **Machined from heavy bar stock**— Both body and stem-guide. Sturdiest basic construction known.
- **Deep "Marpak" packing**—longer lasting; easier to renew.
- **Deep throats and thread chambers** —for tight make-up of piping.
- **Handsome appearance**—Electro zinc plated body, set off by sturdy malleable iron handle finished in heavy, attractive, yellow baked enamel.
- **Clear markings.** Bodies marked in accordance with M.S.S. regulations showing size, material, service symbol, maximum pressure.

The standard series is shown opposite.

Standard globe pattern with double female connections.

Standard globe pattern with male inlet; female outlet.

Standard angle pattern with double female connections.

Standard angle pattern with male inlet; female outlet.

When you need welding fittings...

your GLOBE distributor can be your warehouse

Among the many advantages you get by dealing with your Globe Welding Fittings distributor is the fact that you can hold inventory to a sensible minimum and conserve stockroom space.

That's because he carries a wide range of types and sizes of welding fittings in stock. Thus, your welding fittings supply is no farther away than the nearest phone. At the same time you can simplify much of the paperwork usually required for extensive inventory control, purchasing and bookkeeping.

Call your Globe distributor now — get the facts on the many ways he can serve you . . . help you save time and money.

GLOBE STEEL TUBES Co., Milwaukee 46, Wis.

For the name of your Globe distributor, call any of these District Offices.

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Only Globe — among manufacturers of seamless Welding Fittings — produces its own seamless tubes. Only Globe offers you precision-processed fittings through every step of production — from billet to tube to fitting.

GLOBE
PRECISION PROCESS

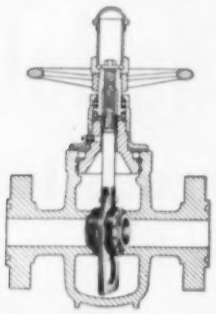
SEAMLESS WELDING FITTINGS

GLOBE TUBES

Producers of Globe seamless stainless steel tubes—Gloweld welded stainless steel tubes — alloy — carbon — seamless steel tubes — Globeiron (high-purity ingot iron) seamless tubes — Globe Welding Fittings.

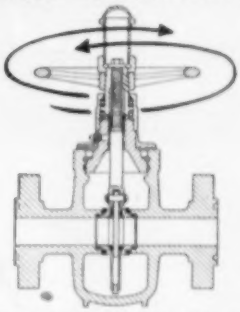
Here's everything you want in a gate valve

POSITIVE SHUTOFF—TIGHT AS A LINE BLIND



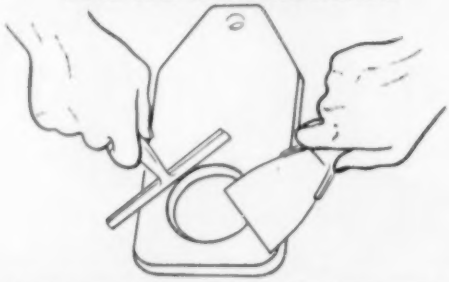
Positive dead-tight seal with pressure on either side of gate. Grove Seal-"O"-Ring Gate Valves also serve as a line blind.

LOWEST TORQUE—OPENING AND CLOSING



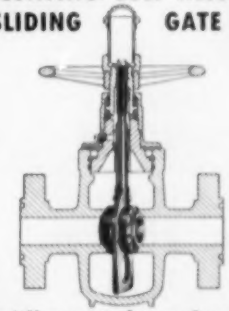
Parallel-sided full-opening port plate is non-wedging, non-galling, non-distorting. Torque required to open or close valve is less than other types of gate valves.

DUAL SELF-CLEANING ACTION



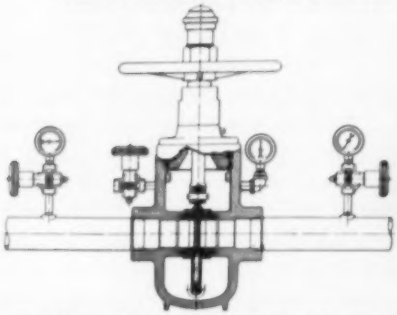
Steel seat assemblies and resilient "O" ring seals are in constant contact with full-opening port plate. Seating surfaces are stripped clean, squeegeed and polished with each operation.

FULL-FLOATING, SELF-ALIGNING FREE-SLIDING GATE ACTION

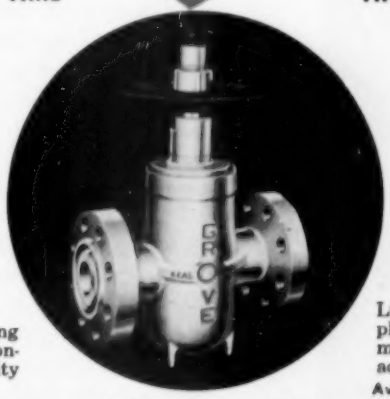


Open, closed or throttling, port-plate and seats are free-floating for perfect self-alignment, constant dead-tight seal, easy sliding action, imposing no strain or stress.

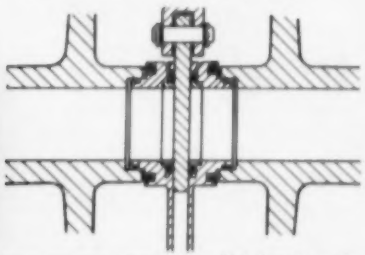
CHECK IT IN THE LINE—ANY TIME



Freedom of gate can be checked by turning hand-wheel, without "breaking" the seal. Non-variance of gauge pressure on body cavity verifies dead-tight seal of valve.



THE GREATER THE PRESSURE THE TIGHTER THE SEAL



Line pressure forces parallel-faced port plate against seat assemblies for positive metal-to-metal seal plus dual sealing action of resilient "O" rings.

Available through leading oil field supply houses

GROVE SEAL-"O"-RING Gate Valves

GROVE REGULATOR COMPANY • 65th & Hollis Sts., Oakland 8, California

HOUSTON 4—1901 Calumet St. • **LOS ANGELES 6**—1930 W. Olympic Blvd. • **NEW YORK 17**—415 Lexington Ave.

GROVE
SIMPLICITY
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1. LOWER INSTALLATION COSTS
2. LESS ROD STRAIN
3. NO COUNTER-BALANCE WEIGHTS
4. LOWER POLISH ROD LOADS
5. LESS HORSEPOWER REQUIRED
6. AUTOMATIC COUNTER-BALANCING
7. MORE PLUNGER OVERTRAVEL
8. LESS VIBRATION

No Snap - No Whip No Jolts

makes rods last longer

The longer, slower stroke, the smoother reversal and slower load acceleration of Parkersburg Air Balanced Pumpers is the greatest rod protection you can have. On the Parkersburg Air Balanced Pumper the beam is down, reversing the load, while the crank is in the lower half of the cycle. At this point the motion is at a minimum and, consequently, acceleration is at its lowest.

The slower motion at the time the rods are brought to a stop and starting upward prevents the whip or snap action caused by the jolt of sudden reversal.

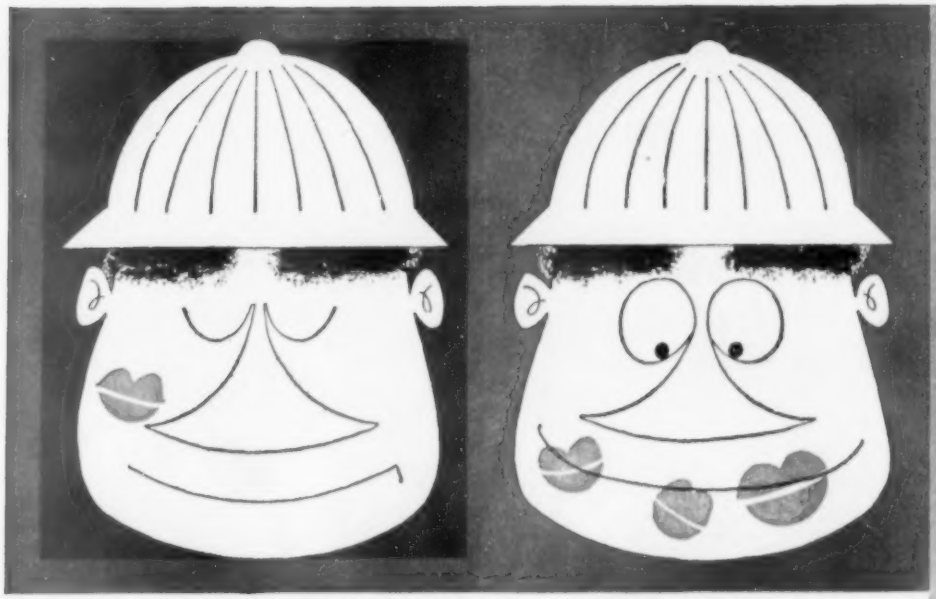
This smoother, easier handling of the rod string means added protection against unnecessary and undue damage. Ask your nearest Parkersburg Representative to show you the facts substantiating this money-saving feature of Parkersburg Air Balanced Pumpers.

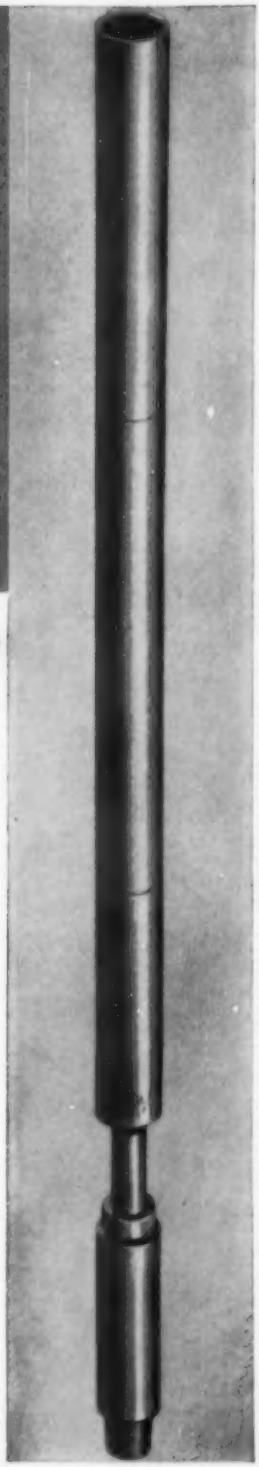
5419

THE PARKERSBURG RIG & REEL COMPANY • PARKERSBURG, WEST VIRGINIA

Division of Parkersburg-Aetna Corporation

PUMPERS — Air Balanced • Chain Driven • Gear Driven





HITS WITH ANY DESIRED INTENSITY!

the Johnston-Sutliff HYDRAULIC JAR

The Exact Pressure You Want, from a gentle tap to a rugged bump! Changes to meet varying conditions without coming out of the hole; needs no torque!

Only Two Moving Parts! You're sure of dependable service plus easy operation! And the Johnston-Sutliff Hydraulic Jar is available in all drill pipe sizes!

Adaptable for Use with the Johnston Formation Tester, the Johnston-Sutliff Jar is just as effective for fishing or any other job where pipe or equipment is lodged in the well!

AVAILABLE *everywhere* • ACCURATE *every time!*

JOHNSTON TESTERS

first in drill stem testing

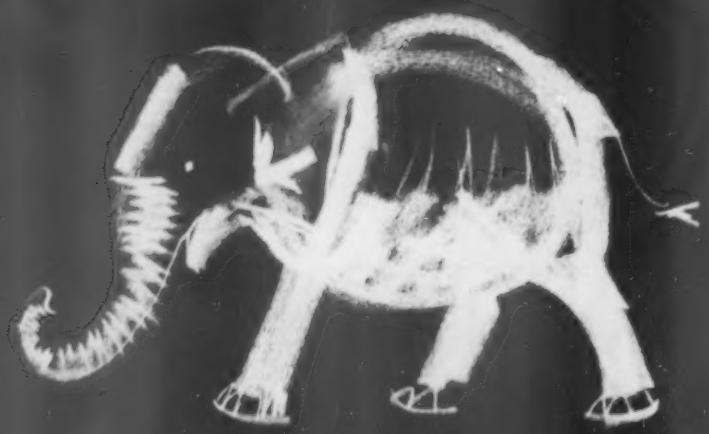
HOUSTON, TEXAS

LOS ANGELES, CALIF • CALGARY, CAN.

FORMATION AND JOHNSTON CASING TESTING

J343

WHEN YOUR JOB CALLS FOR
CHAIN WITH THE LONG LIFE OF AN



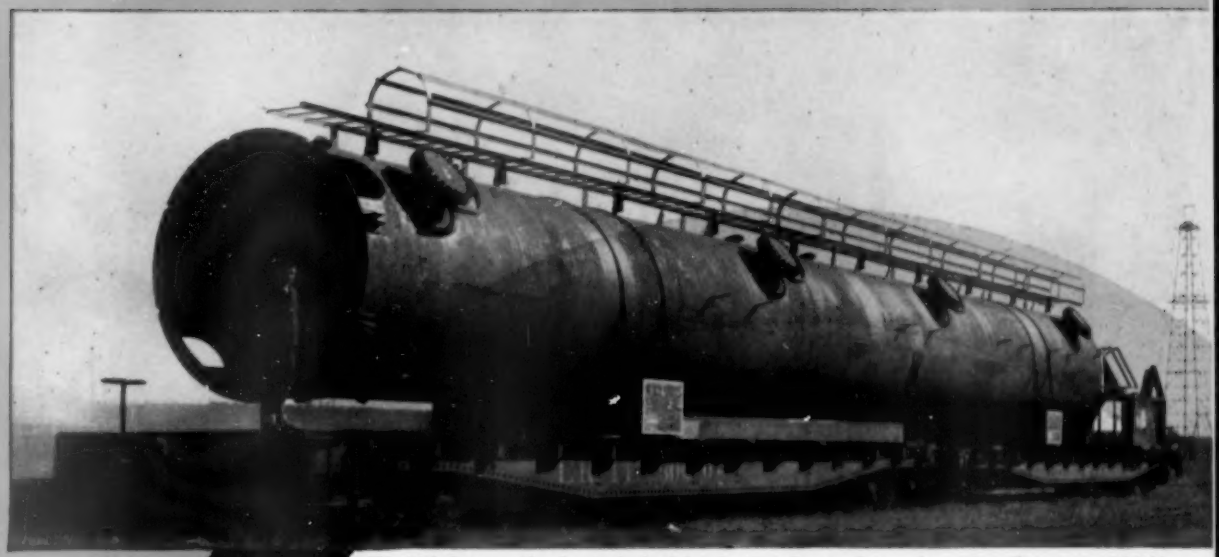
BE SURE IT'S
REX ROLLER CHAIN*

THE CHAIN THAT CONSISTENTLY DOES A DAY'S WORK YEAR AFTER YEAR AND DOESN'T EXPECT TOO MUCH ATTENTION. DRILLERS LIKE THE LONG SERVICE RECORD OF REX ROLLER CHAINS.

CHAIN BELT COMPANY
ROLLER CHAIN DIVISION
357 PLAINFIELD STREET
SPRINGFIELD 2, MASS.

*WE'VE CHANGED OUR NAME... but the chain's the same. Baldwin-Rex Roller Chain is now called Rex Roller Chain and the Baldwin-Duckworth Division is now known as the Roller Chain Division of Chain Belt Company.

Custom Fabricated Pressure Vessels . . .



This High Pressure Absorber is destined for the West Texas refinery of a major oil company. Weighing more than 197,000 lbs., it has a shell plate thickness of 1.52", and is 7'-6" in diameter by 82'-3" long.

. . . To Help The Petroleum Industry Meet The Challenge of Tomorrow

On its way from our Oklahoma City plant to an Illinois refinery via three railroad flat-cars, is this 4'-6" by 140' "Long John." Its total weight is only 56,000 lbs.

Bound for a Gulf Coast refinery is this 124,000 lb. pressure vessel, fabricated by BS&B. With over-all dimensions of 13' by 137', three flat-cars are required to transport it.

The technology of petroleum processing and refining has come a long way since we built our first pressure vessel for the industry some 25 years ago. But with development of newer and more advanced processes and techniques has come the challenging demand for specially fabricated pressure vessels of complicated design to meet the exacting requirements of the new processes.

BS&B, with some of the largest and most modern custom fabrication facilities west of the Mississippi River, has become known as one of the industry's leading quality fabricators of custom equipment.

In our Oklahoma City plant, for instance, we are equipped to do automatic and semi-automatic submerged arc, automatic and semi-automatic inert-gas-shielded arc, manual arc and gas welding to conform to all recognized code requirements, and can fabricate plate thicknesses from 14 gauge through 4½".

Our well-equipped machine shops can fabricate both ferrous and non-ferrous alloys, solid and clad materials. In our 2300° F. annealing oven we can heat treat units measuring up to 80'-0" in length, 15'-8" in diameter and weighing up to 125 tons. The very latest in quality control, inspection and testing techniques and equipment are in constant use throughout.

Take advantage of BS&B's conveniently located modern facilities and years of fabricating experience on your next project! Our representatives will be glad to discuss it with you in strictest confidence. Or write to . . .

Contract Sales Division, Dept. 5-A8

EFFICIENCY OVER 50 YEARS BS&B RELIABILITY

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1 Proven Depth Measurement Accuracy. 2 Maximum Penetration. 3 Full Range of Modern Equipment. 4 Quick Dependable Service through 95 Branches in the U.S., Canada and Venezuela. 5 Experience Gained in More than 200,000 Jobs in 22 Years. 6 Unexcelled Safety for Property and Personnel. 7 Through Local Knowledge of Your Field and Your Well Conditions.

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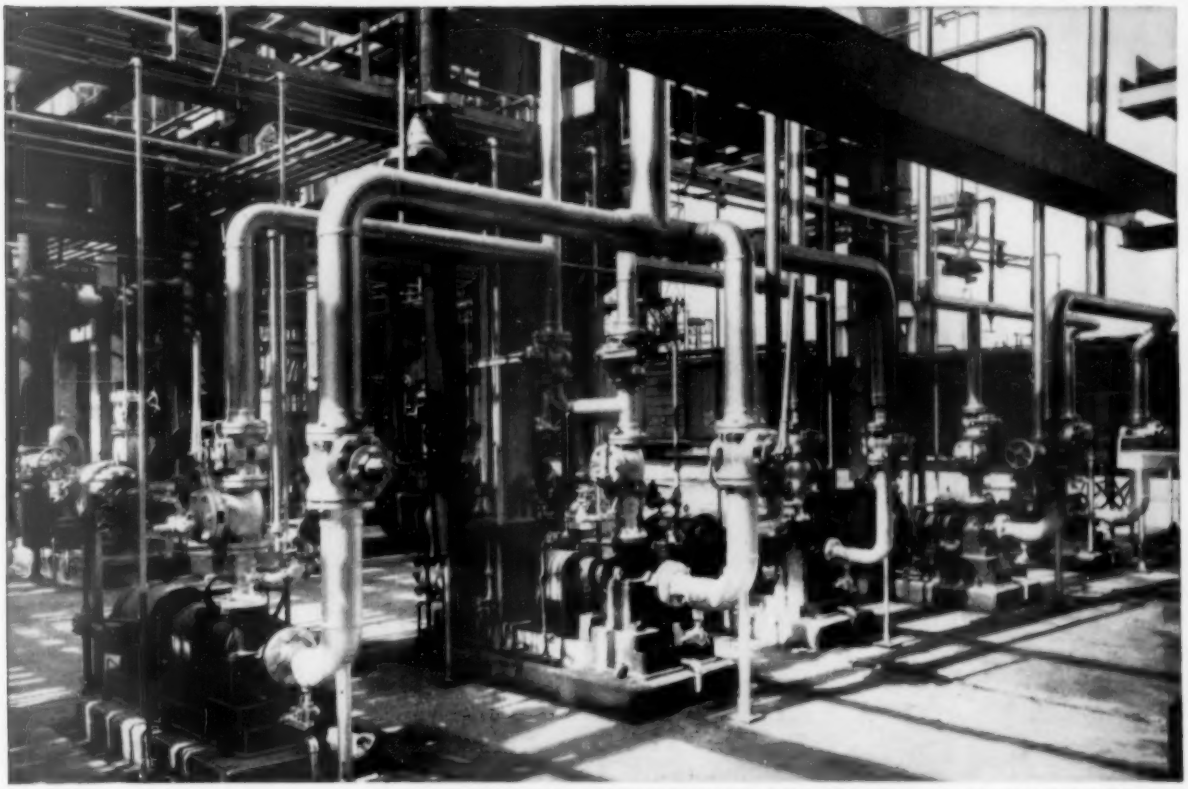

FORTY-FIVE WORTHINGTON HEAVY-DUTY HM PUMPS are on the job at Sinclair's new Houston refinery. Five of the HM's are shown in the foreground of the photograph.

Sinclair selects Worthington HM heavy-duty process pumps

Forty-five HM pumps are operating continuously on crude distillation and cracking service at Sinclair Oil's Houston, Texas, refinery.

These features built into the Worthington HM help give this heavy-duty line long life, lower maintenance, and day-in, day-out reliability.

1. Centerline support, water-cooled stuffing box and bearings for efficient high temperature operation.
2. Worthington's special mechanical seals for the higher pressures.
3. Confined casing gaskets and hook-type hardened stainless steel shaft sleeves.

And because the HM is an end suction pump, piping is simplified and there's no interference of valving in suction and discharge lines.

Find out more about this heavy-duty Worthington pump available in carbon steel, alloy steels, and cast iron. Write for free Bulletin, W-341-B14, to Worthington Corporation, Centrifugal Pump Division, Harrison, New Jersey. C.4.8

WORTHINGTON

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

Types HR and HB. 19 sizes. Capacities up to 1,800 gpm. Developed heads up to 900 ft. Proper selection of materials permits use for temperatures far below zero to 800 F, for pressures from high vacuum to 750 psig.

Type CNE. For loading or transfer service. Capacities to 2,700 gpm. Heads to 500 ft.

Type HM. Available in 12 sizes. Capacities to 700 gpm. Heads to 475 ft. Up to 500 F.

Type HD. Hydraulically balanced double-suction impeller handles boiling liquids with low submergence. Capacities range from 600 to 3,200 gpm at heads up to 700 ft. To 850 F and 550 psig.

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HYDRAULIC AND BREATHER FILTERS

As Original Equipment on Your Hydraulic Machinery

Fit the filtering requirements of your hydraulic machinery to your specific needs by installing Staynew Hydraulic and Breather Filters.

Staynew HE Hydraulic Filter

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DOLLINGER PROTECTED BY STAYNEW FILTERS

HYDRAULIC FILTERS

Compact, simplified filters for use wherever dirty liquids are collected, filtered or recirculated. Wide range of metallic mesh and fabric media are available. Long operation assured without cleaning or replacement.

BREATHER FILTERS

Permit practically constant interior pressure by allowing atmospheric air to be drawn in or exhausted as required—while preventing entrance of impurities and escape of liquid mist or fog.

When you build this perfect combination into your hydraulic machinery, you'll save costly equipment wear, spoilage, and maintenance time.

Let our Engineering Department solve your hydraulic filtration problems. Write today for Bulletin HF-2.

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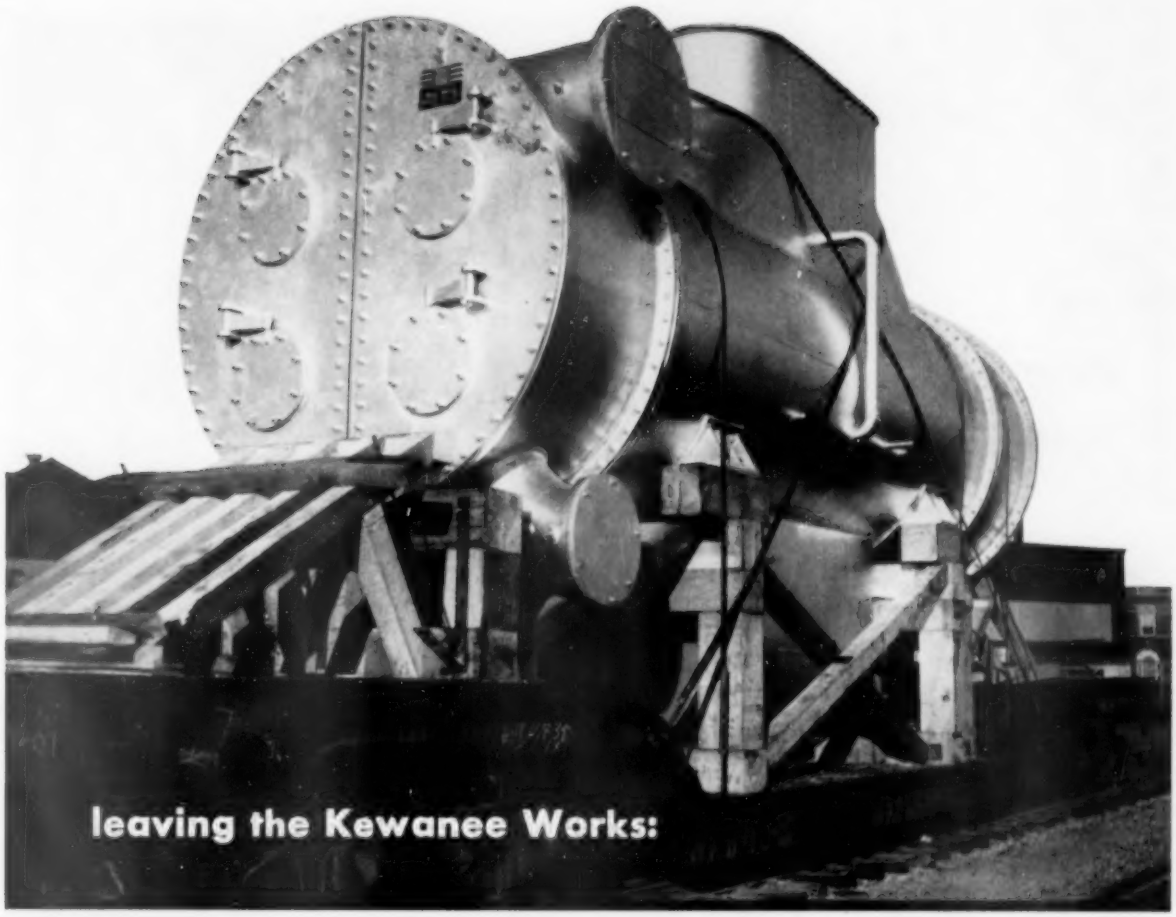
ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED



ROSS SURFACE CONDENSERS TRAVEL TO ALL CORNERS OF THE WORLD

Leaving the Kewanee, Ill. plant, this Ross Surface Condenser is one of a pair bound for New Mexico. It's a relatively short trip compared to the distances that many Ross units have traveled to reach countries such as Australia, Brazil, Iran, Aruba, Sumatra . . . mentioning but a few. Their efficiency and dependability have been proved in remote and isolated locations all over the world.

The reason Ross Surface Condensers are widely preferred, for installations both in the U. S. and foreign countries, can be expressed in two words: *advanced engineering* . . . engineering that introduced the first all welded steel surface condenser at Parr Shoals, S. C. in 1929 and pioneered numerous other developments, including Balanced Flow and divided tube bank design.

It's only logical then, that Kewanee-Ross is best qualified to meet *your* surface condenser requirements, too. Consultation with Kewanee-Ross engineers will leave you assured of this.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1417 WEST AVENUE • BUFFALO 13, N. Y.
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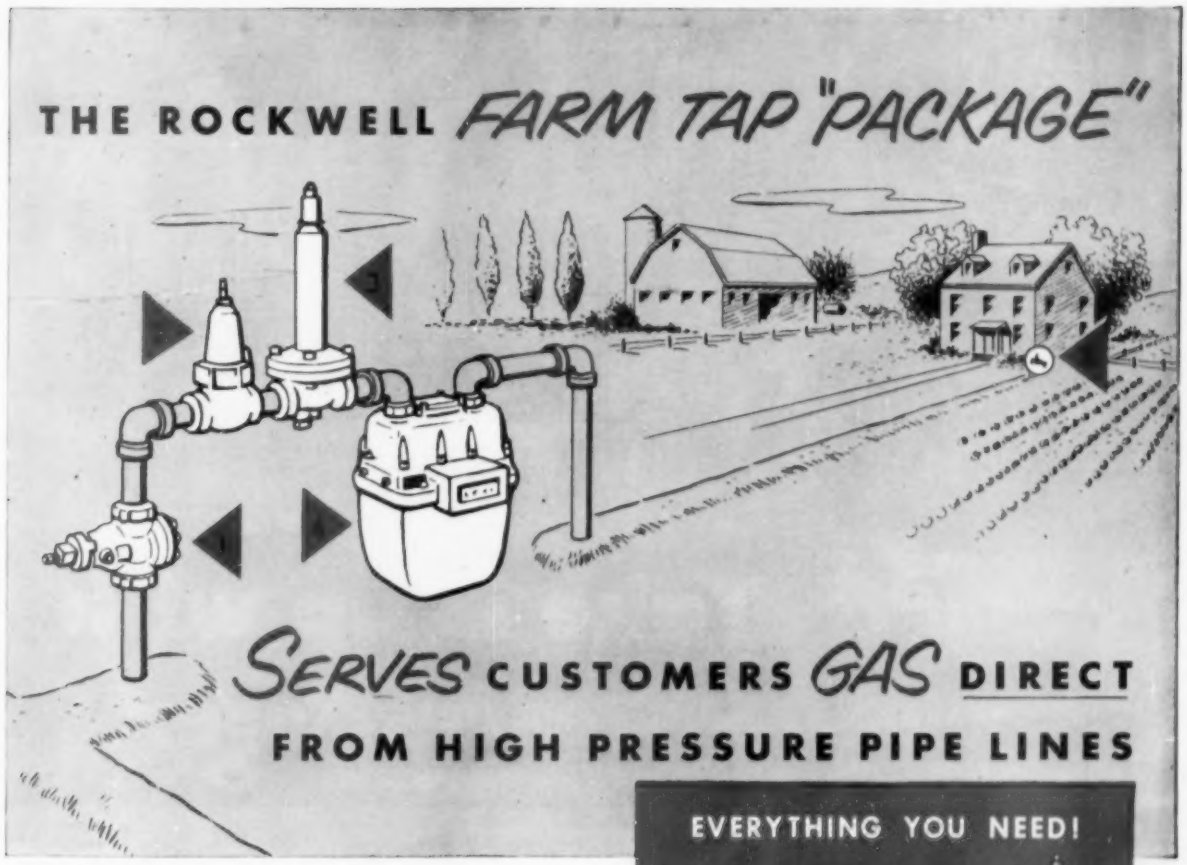
Going down— three miles . . .

Some oilmen analyze the rocks. Some survey the land. Some listen for shocks deep in the earth. But nobody knows there's oil for sure until the drill itself has found it. That's why some say the driller's job is best — he's the first to *see* what all are searching for. He's got to be strong, brainy, able to fit into a smooth functioning team — the drilling team. For that is what it takes to start the flow of crude that ends up in fine Texaco products for marketing in all 48 states.

The Texas Company

TEXACO

THE ROCKWELL *FARM TAP "PACKAGE"*



SERVES CUSTOMERS *GAS* DIRECT FROM HIGH PRESSURE PIPE LINES

High pressure is no barrier to serving individual farms, ranches and small industries from your transmission lines. The double reduction system in this Rockwell farm tap "package" assures a high safety factor since both primary regulators are designed to handle the full line pressure. By dividing the regulating load, heavy mechanical stresses, valve abrasion and scoring of seats are eliminated.

The Rockwell "175" high pressure meter is especially designed for this service. The case is tested for 50 psi working pressure. This meter can be optionally furnished with either a standard index or compensating indexes for 10 psi or 50 psi measurement. *Write for full details and prices.*

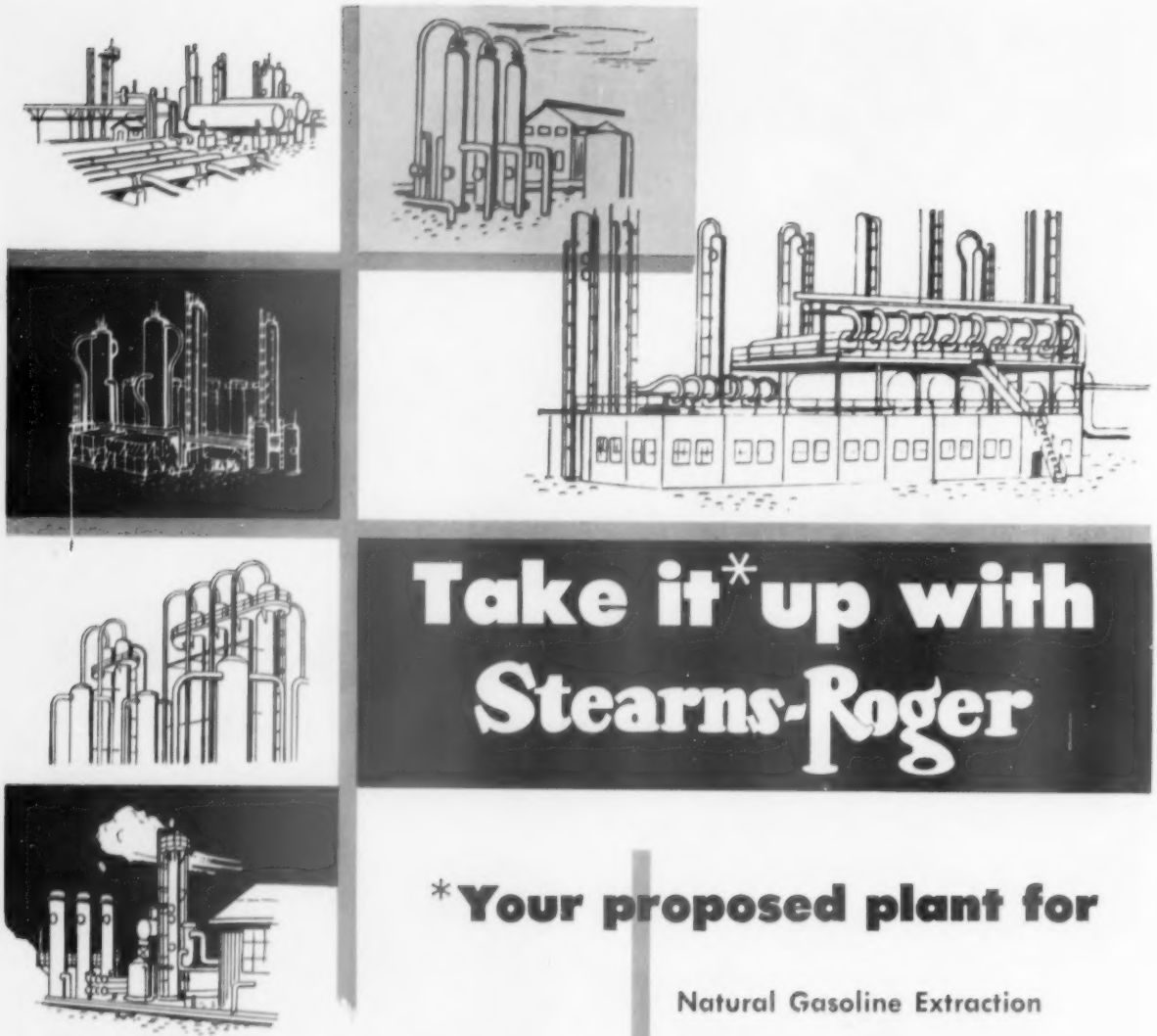
YOU CAN RELY ON ROCKWELL

EVERYTHING YOU NEED!

1. **NORDSTROM STEEL VALVE** . . . provides quick, positive quarter turn off and on control over line pressure.
2. **ROCKWELL "118" REGULATOR** . . . makes the primary cut from 1000 psi or less to an outlet pressure of 100 psi.
3. **ROCKWELL "100" REGULATOR** . . . makes the secondary pressure cut, feeds gas to the Rockwell "175" meter at 10 psi.
4. **ROCKWELL "175" HIGH PRESSURE METER** . . . has 10 psi compensating index. Will operate with complete safety at 50 psi.
5. **ROCKWELL "107" SERVICE REGULATOR** . . . located at the dwelling, makes the final pressure cut to inches of water.

ROCKWELL MANUFACTURING COMPANY PITTSBURGH 8, PA.

Atlanta Boston Chicago Dallas Houston Kansas City, Mo. Los Angeles New York
Philadelphia Pittsburgh San Francisco Seattle Tulsa *In Canada:* Peacock Brothers Limited



Take it* up with Stearns-Roger

*Your proposed plant for

- Natural Gasoline Extraction
- Sulphur Recovery
- Gas Sweetening
- Distillate Recovery
- Gas Dehydration
- Gas Compressor Stations
- Packaged Gas Compressor
- Chemical Manufacture

Our experience in engineering, designing, and constructing plants and specialized equipment for processing natural gas can be worth important money to you. It embraces plants from the smallest to the largest—from the oldest in Wesern areas to the present advanced designs.

A contract with Stearns-Roger fixes total responsibility with one organization—covering all services from engineering and design through construction and placing the completed plant in operation. Training of operating personnel is included if desired.

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Stearns-Roger

THE STEARNS-ROGER MFG. CO. DENVER, COLORADO

the Sky's the Limit

with **SUPERIOR** HEAT EXCHANGERS

Unlimited engineering facilities plus an adequate plant and equipment, make the sky the limit on Superior Combustion Industries' ability to design and fabricate heat exchangers for the most unusual conditions. Those shown here, designed for gas-to-gas heating, are 40 ft. high and 40" in diameter.

Our engineering staff invites your inquiry regarding any proposed installation . . . as a basis for a specific engineering recommendation.

For details of construction, write today for fully illustrated Catalog 6011.

for performance you can **BANK** *on*

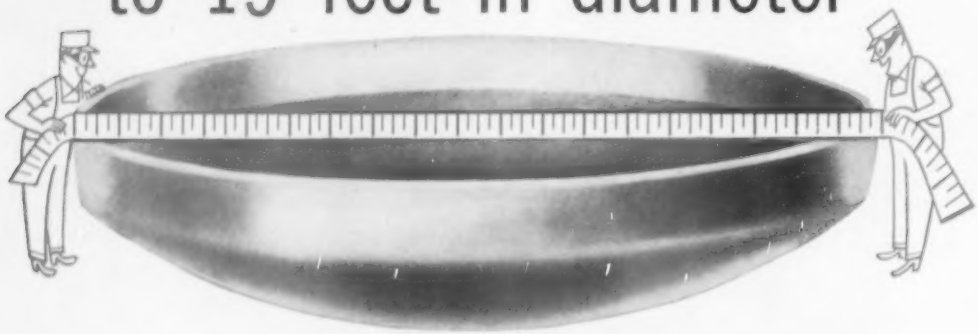
SUPERIOR HEAT EXCHANGERS

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

CLAYMONT FLANGED AND DISHED HEADS

from 9 inches

to 19 feet in diameter



Flanged and dished heads made by Claymont are available in sizes from as small as 9 inches to as large as 19 feet in overall diameter; and in gauges from ¾-inch to 6 inches. They can be supplied in carbon steel, alloy steel or with stainless steel cladding.

All carbon and alloy steels are the product of our own open hearth furnaces—closely and completely controlled to meet customers' specifications.

We are also prepared to handle head-forming operations on both ferrous and non-ferrous metal supplied by the customer. To order, write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, 813 West Street, Wilmington 99, Delaware.

Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

CF&I

2576

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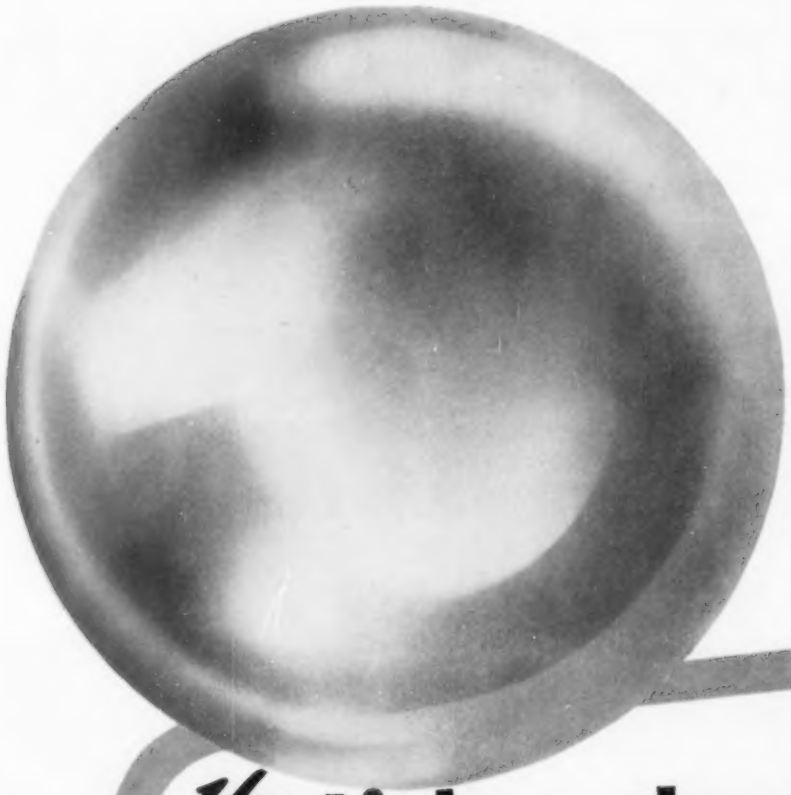
CANADIAN REPRESENTATIVES AT • Edmonton • Toronto • Vancouver • Winnipeg

Other Claymont Products . . . **Carbon and Alloy Steel Plates • Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Flame Cut Steel Plate Shapes**



1/3 Lighter than Steel

Lasts 20 times longer

Used in sub-surface check valves, Kennametal Light-Weight Titanium-Carbide* Balls minimize down-the-hole trouble caused by ball flutter, cage wear, and fluid pounding.

Their titanium carbide and nickel content assures higher resistance to corrosion and electrolytic action. They provide unexcelled performance in sour crudes and hydrogen sulfide gases.

Diamond-like hardness of these Kentanium Balls increases valving efficiency in pumping flour-sand cut fluids and other abrasive mixtures. Sphericity is maintained in conditions of severe impact, ball spin-wear, and cage beating.

Remarkable lightness of the Kentanium Ball reduces friction and impact shock — an important factor in slant pumping, or where cages of soft metal must be used.

You can obtain Kennametal Light-Weight Titanium-Carbide Balls from your regular supplier.

**called Kentanium*

KENNAMETAL®

PUTS AN END TO DOWN-THE-HOLE CHECK VALVE TROUBLE

Quality Sintered Carbide API Balls and Seats

Manufactured by

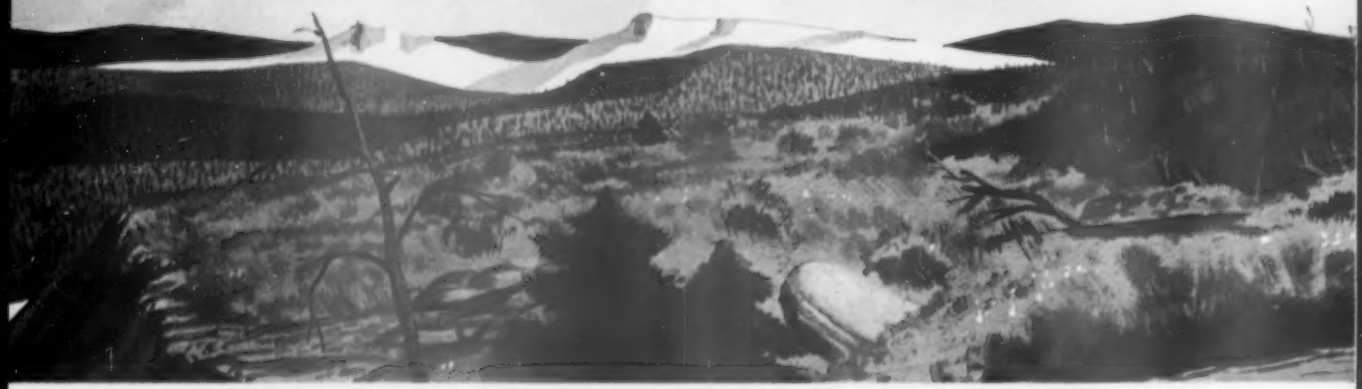
Kennametal Inc., Latrobe, Pa.

SOLD BY YOUR REGULAR SUPPLIER

The manufacture-supply-service industry gives the oil industry the ultimate in....

APPLIED

It took the world's greatest research and engineering brains to build the GIANT MECHANICAL HEART that keeps a three-mile-deep drilling well alive . . .

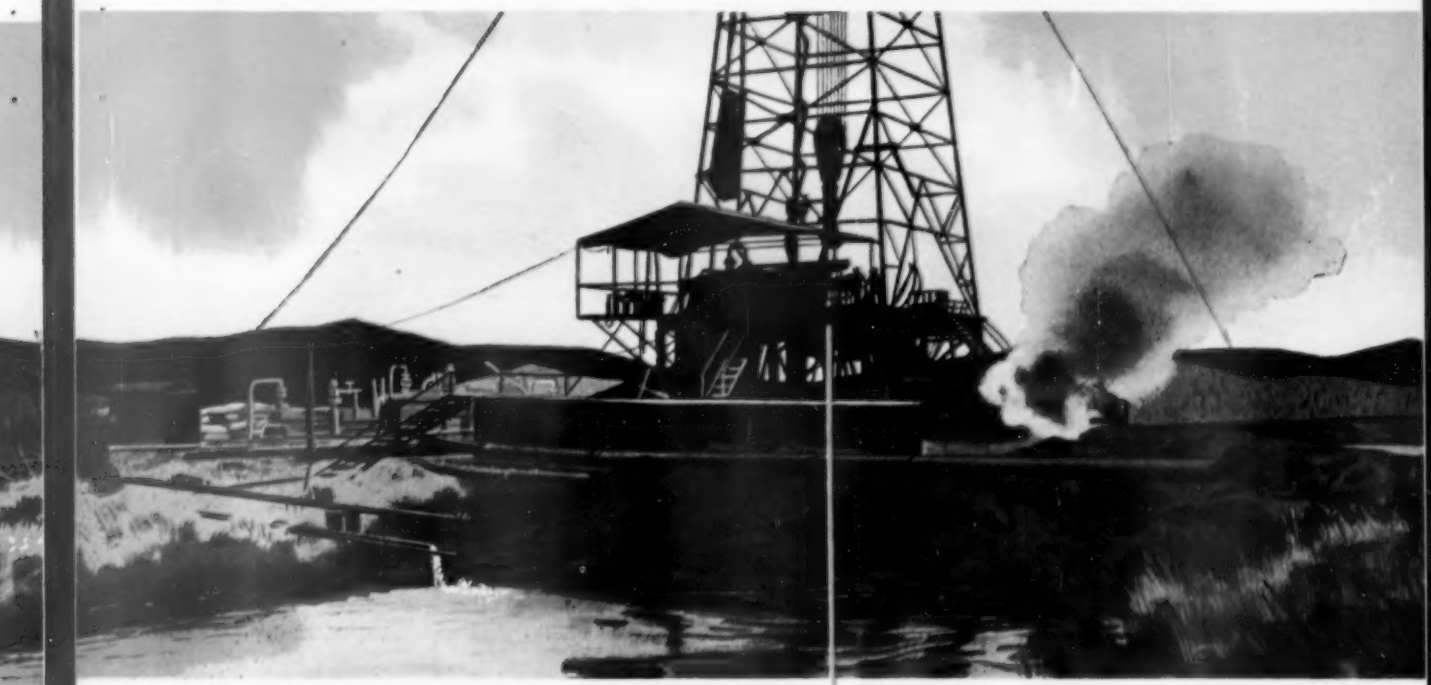


To build a slush pump that could keep the circulation going in a three-mile-deep well with pressures up to 3,000 pounds per square inch, and in lower pressures, in volumes up to 1,000 gallons per minute, has required practically every kind of technical knowledge.

This giant unfailing mechanical heart is the epitome of decades of study and experimenting by the combined engineering departments of leading manufacturers in the billion-dollar oil equipment business, working in the laboratories and in the oil fields. Brilliant research engineers, through these many years, have carried on: (1) experimental designing, and testing in experimental test pumps under various extreme conditions to obtain performance data; (2) field testing under actual drilling conditions. Using this data, designing engineers have, with indomitable persistence, solved problem after problem.

Yet, this giant mechanical heart could not have stood the extreme pressures, abrasive cutting, and shock, had not the science of metallurgy kept apace. Carefully controlled heat treating has resulted in the needed tougher, longer-lasting steels. Then came the manufacturing techniques using precision gauge blocks to calibrate the production gauges used in the mass production of pumps and pump parts with high uniformity in dimensions and surface finish.

SCIENTIFIC KNOWLEDGE



4479

Now, we see in every oil field these mechanical hearts keeping wells alive with little heart trouble and seldom heart failure. This triumph of engineering is repeated in many another oil industry product that receives the ULTIMATE IN APPLIED SCIENTIFIC KNOWLEDGE FROM THE 9,000 SCIENTISTS AND ENGINEERS OF THE PETROLEUM MANUFACTURE-SUPPLY-SERVICE INDUSTRY.

Result of this applied advanced knowledge: lower costs in exploration, drilling, producing, transporting.

MANUFACTURE
SUPPLY
SERVICE

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

FAMOUS WESTERN SIX-SHOOTER

The Peacemaker 45

The Peacemaker by Colt, one of the most famous American weapons, was introduced in 1873. It was a single-action, .45 caliber cartridge revolver with a 7½-inch barrel. Officially an Army revolver, it was adopted by Westerners as a personal weapon and became the famous six-shooter of the West.

FAMOUS TOO IS WESTERN'S SIX-PER-FOOT JET GUN!

Western's high caliber Perforating Unit.

Unit's power and speed make Western jobs faster.

Rolled steel construction makes Western's six-per-foot jet gun true and dependable.

With WESTERN's famous new six-per-foot jet gun, you can have six-per-foot perforating density in ONE-HALF the time required with regular four-per-foot guns.

And only WESTERN's six-per-foot gun uses an 18-gram charge and delivers for you the same high penetration of standard 4" OD jet guns.

Another exclusive feature of WESTERN's six-per-foot jet gun is that ONLY ONE PRIMACORD IS REQUIRED, eliminating the interference from charge to charge frequently found in multiple cord guns. This means the charges will always be aimed accurately for maximum penetration . . . and for constant 120-degree spacing with advantages of better drainage and savings on pipe.

WESTERN six-per-foot guns also have the same safe bottom-fire mechanism as all Western Jet Guns . . . are air-tested for leaks before each job . . . and are handled by the same experienced crews that are making WESTERN's perforating service *famous* for dependability . . . *famous* for results.

General Offices: Midland, Texas

THE WESTERN COMPANY

Engineered Well Services

ACIDIZING
PERFORATING
Jet and Bullet

FRACTURIZING
GAMMATRON
Radioactivity Well Logging

WESTERN Engineered WELL SERVICES

They Say—

Fracturing Testimonial

Dear Sir:

Here's a little more proof that fracturing pays off in eastern Kansas.

Enclosed in a photo (above) of L. F. Moore 2 drilled in Wilson County, Kansas, a year ago by the Tec Oil Co. of El Dorado, Kans. The well made only a few quarts of free oil overnight. It was fractured by Halliburton September 13, 1953, and flowed 234 bbl. in the first 20 hours and is still flowing almost a year later.

The well flows strongly every day and looks like it will be flowing a good many months longer. It is still good for 20 bbl. a day and has never made any water. It flows through a ⅞-in. choke at surface.

Eastern Kansas isn't ready for the boneyard yet.

Herb Caldwell
Tec Oil Co.
El Dorado, Kans.

Mid-Continent Warning

Dear Sir:

I enjoyed the article in The Oil and Gas Journal on the Rocky Mountains area *(August 9 issue, page 72)*.

I cannot whole-heartedly agree with many of your assumptions in the article, because 200,000 bbl. a day of new crude . . . is being shipped into the Mid-Continent area, and it becomes a very vital and important factor. . .

. . . In talking about the Rocky Mountain area most of us think of North and South Dakota as being included . . . and when you have the crude production added up there, some of which is being shipped at distress prices into the Mid-Continent market,

SCALE OF MILES

0 10 20 30 40 50 100

. . . accurate liquid level gauging-

at ANY DISTANCE!

"Varec"

SEE PULSE CODE AT THE INSTRUMENTS SHOW IN PHILADELPHIA, SEPT. 15-21 BOOTHS: 757, 759, 761

PULSE CODE
TELEMETERING SYSTEM
(PATENTS APPLIED FOR)

THE VAPOR RECOVERY SYSTEMS COMPANY has successfully eliminated the one great drawback to accurate transmission of remote tank gauging over long distances — *loss or gain of a part of the signal.*

Through use of the pulse code method of message transmission the system utilizes a separate pre-arranged code for each ⅛" increment of measurement.

At the receiver, the code transmitted by the tank unit is translated into the equivalent measurements — there can be no borderline cases where the reading might fall between two increments. The receiver will either produce the *correct* reading as transmitted *or it will not produce any reading.*

Obviously such an exact system is not confined to liquid level telemetering alone. It can be readily applied to numerous supervisory control problems such as remote control of pump motors, control valves and associated equipment. Thus the complete dispatching operation, gauging and remote control is integrated into one single unitized system when a "Varec" Pulse Code Telemetering System is installed.

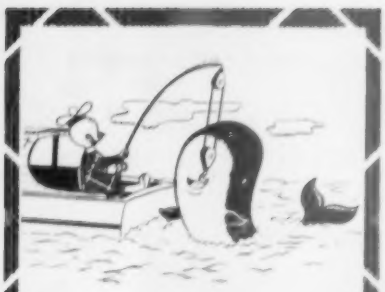
The equipment is also capable of providing tank liquid level alarms or warnings of any off-normal conditions at the remote control point. Further, the receiver readings may be fed into automatic printing equipment for a permanent record and automatic sequencing equipment may be added to provide fully automatic tank gauging.

Before you install any type of remote gauging we urge you to thoroughly investigate the "Varec" Pulse Code Telemetering System — write today for complete details.

"Varec"

THE VAPOR RECOVERY SYSTEMS CO.
COMPTON, CALIFORNIA
Cable Address: VAREC COMPTON
Calif. (U.S.A.) All Codes

961-2



"You'll get a WHALE of a lift - wi' McKISSICK!"

McKISSICK

Heavy Duty

SNATCH BLOCK

Are Dependable

★ Heavy steel construction throughout for extra weight. 6"-8"-10" sheaves grooved to any line size.

★ 2" diameter center pins, Hi-Load roller bearings, Hi-Speed bronze bushings.

★ Side plates bolted at three points, minimizes tendency to spread.

McKISSICK

McKISSICK PRODUCTS CORPORATION

Box 2496 Tulsa, Oklahoma

you have another straw that weighs heavily on the already over burdened camel.

Looking down the road, you have considerable Canadian oil coming in from the northwest . . . which will again push back Oklahoma, Kansas, and North Texas crude. . .

Proration must become effective up there, plus proration on imports, plus curtailment of major company refineries, or we are in serious trouble for the future.

M. Lloyd Freese
Vice President and Manager, Production, Pipelines, and Marketing Bell Oil & Gas Co.
Tulsa.

"Miracle Fuel"

"The coming of natural gas to the Pacific Northwest will accelerate the building of a great industrial empire. This miracle fuel is of so great importance to you as leading citizens that I am making available to you the advanced story of its astounding nature and effectiveness . . .

"As it has done everywhere else throughout the nation, natural gas will expand the comforts of our people in their homes and give architects the opportunity to design the really modern dwelling of the day . . ."

N. Henry Gellert, president of Seattle Gas Co., in a letter mailed to customers along with a pamphlet, "The Five Miracles of Natural Gas."

How Iran Can Help

"The community of free nations stands to gain from this settlement . . . only if Iranian and other Middle East oil producers use discretion . . . in determining the amount of oil they will export. . ."

Sen. Price Daniels of Texas in a statement issued in Washington.

Pipeline's History

Dear Sir:

Wonder how many old Ajax pipeline boys have written you to call your attention to the error in stating that the Ajax system was built in 1936. Your source of information was wrong by 6 years as the Ajax system started pumping crude through the twin 10-in. system in the fall of 1930.

I was transferred from the Humble Pipe Line Co.'s May station in Brown County to the Ajax company's Racine, Mo., station near Joplin, arriving there 2 days after Thanksgiving, 1930. Crude was already pulsating through those 10-in. arteries then. . .

So the Ajax, taking its name from the mythological Greek who carried the largest shield in battle, itself has now become a myth in pipeline history. The story was a great one as regards to the millions of barrels of crude it transported.

Robert S. Notestine
Socony-Vacuum Oil Co., Inc.
Eastern Pipeline Division
Plainfield, N. J.

Texas Production Should Rise

"These circumstances (slightly increased imports) and relatively high gasoline inventories have caused Texas to restrict proratable wells producing only 50 per cent of the time in July and August. . . However, Texas production during the next 4 months should exceed the current low levels if demand improves as anticipated."

L. T. Barrow, chairman, and Hines H. Baker, president, Humble Oil & Refining Co., in a letter to stockholders.

Future Gas Market

". . . New gas supplies will continue to be discovered, especially now that higher field prices have stimulated drilling. Even at prices some higher than now prevail, our customers will be able to sell more and more gas for preferred uses such as house heating and manufacturing operations . . .

"For so-called inferior purposes where coal and oil may be substituted, gas will have to yield when its prices become prohibitive. Thus, we must expect a changing but still expanding market."

Tom P. Walker, president of Transcontinental Gas Pipe Line Corp., in an article printed in the July-August issue of Transgas, company publication.

CALENDAR OF EVENTS

SEPTEMBER

6-11 American Chemical Society, national meeting, Conrad Hilton Hotel, Chicago

7-9 Association of Desk and Derrick Clubs of North America, annual convention, Banff Springs Hotel, Banff, Alta.

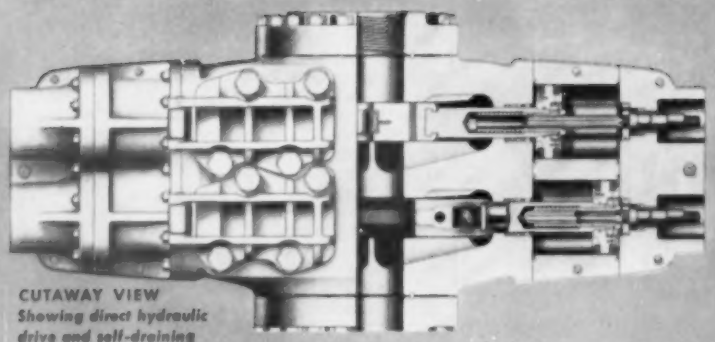
8-10 Pacific Coast Gas Association, sixty first annual meeting, Vancouver Hotel Vancouver, B. C.

9-11 Billings Geological Society, annual field conference, Billings, Mont.

9-11 Interstate Oil Compact Commission, Omaha, Neb.

10 Southern Gas Association, conference on compressor-station operation, Jung Hotel, New Orleans.

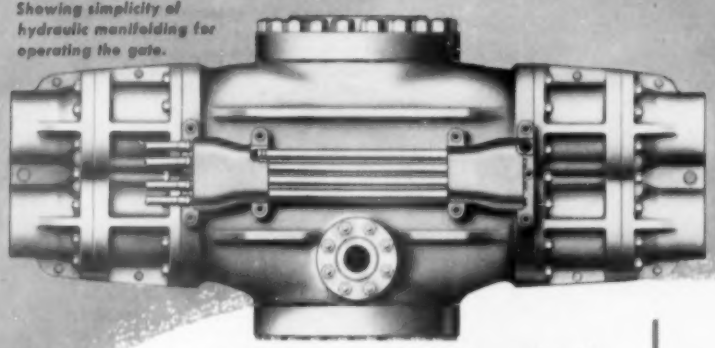
12-16 American Institute of Chemical Engineers, Colorado Hotel, Glenwood Springs, Colo.



CUTAWAY VIEW
Showing direct hydraulic drive and self-draining ram compartments.

any way you judge
SHAFFER HYDRAULIC CELLAR CONTROL GATES
Are Unsurpassed

REAR VIEW
Showing simplicity of hydraulic manifolding for operating the gate.

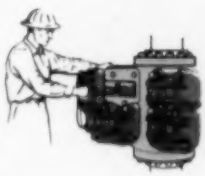


Naturally, *Safety* is the top consideration in selecting any cellar control gate equipment, and Shaffer equipment is backed by well over a quarter-century of experience and dependability in the field of pressure control. But, in addition to safety, Shaffer tops the industry in other important advantages, too. For example —

do you want Compactness?

WITH SHAFFER Hydraulic Cellar Control Gates you not only get unusual compactness – in height, width, length – but equally important, you don't have to allow extra space above them for changing rams – nor do you have to allow extra space at both ends of gate for expanding the unit to remove and replace rams.

Rams in Shaffer Hydraulic Gates are quickly changed through patented side-opening doors. Simply unbolt and swing open the door . . . change rams . . . and bolt the door shut again. Closing the door automatically aligns the rams within the gate. Even in sizes as large as 13⅝" (12" Series 900) the gate is only 30" high – and this is total required height – no extra space need be allowed for servicing the rams!



do you want Convenience?

WITH SHAFFER Hydraulic Gates there's no need to dismantle the upper compartment in order to change rams in the lower compartment. You can change rams in either compartment without in any way disturbing or disconnecting the other. Each is completely independent of the other – a valuable safety, as well as time-saving, feature!

do you want Advanced Design?

WITH SHAFFER you get *field-proven* design that has been proven superior under widely-varying types of operations and field conditions. Such advancements as: SELF-DRAINING COMPARTMENT BOTTOMS (no detrimental mud and sand accumulations to interfere with operation of the rams) . . . DIRECT HYDRAULIC DRIVE (no yokes or secondary connections to fail) . . . COMPLETELY ENCLOSED DESIGN (no exposed moving parts to jam or corrode) . . . these and other important advancements are yours for added protection when you specify SHAFFER!

Get ALL the facts on Shaffer Cellar Control Gates before you buy any pressure protection equipment. Compare Shaffer superiority, point-by-point!

do you want Versatility?

WITH SHAFFER – and only with Shaffer – do you get a choice of either Single or Double Hydraulic Gates – whichever best meets your requirements. Rams and most other parts are interchangeable, size for size. Single and Double Gates assure you of maximum adaptability for your particular needs – at minimum inventory and maintenance costs.

Write direct for full details — or see your nearest Shaffer representative.
Send for your free copy of the latest Shaffer Catalog!
See the Shaffer Section of your Composite Catalog.

31 YEARS OF OIL TOOL LEADERSHIP

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HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

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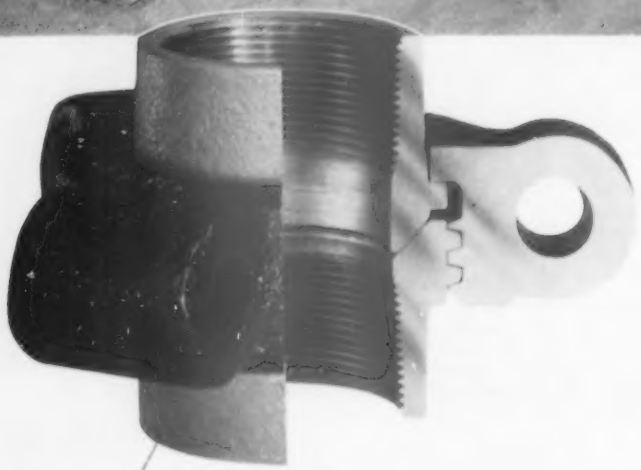
FARMINGTON, NEW MEXICO, Shaffer Tool Works, Post Office Box 546
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

WECO FIG. 100 UNIONS



● on this production header
simplify make-up,
assure leak-proof union connections,
provide easy break-out for service,
and will give years of dependable,
trouble-free service.

PESA

It's wise to standardize with.. WECO

WECO WELL EQUIPMENT MFG. CORP. • Division of Chikson Company • HOUSTON 1, TEXAS

12-17	American Chemical Society, 126th national meeting, New York.
13-14	Independent Natural Gas Association of America, annual meeting, Roosevelt Hotel, New Orleans.
13-25	Instrument Society of America—First International Instrument Congress and Exposition, Museum and Convention Hall, Philadelphia.
15-16	American Gas Association, sixth annual accident-prevention conference, Bond Hotel, Hartford, Conn.
15-17	American Petroleum Institute, lubrication committee, Traymore Hotel, Atlantic City, N. J.
15-17	National Petroleum Association, fifty-second annual meeting, Traymore Hotel, Atlantic City, N. J.
16-17	Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.
17	Natural Gasoline Association of America, Oklahoma regional meeting, Skirvin Hotel, Oklahoma City.
17-18	Kansas Geological Society, 1954 field conference, Rolla, Mo.; repeat trip September 24-25.
23-24	Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper, Wyo.
27-28	Symposium on Methods for Testing Liquefied Petroleum Gases (ASTM D-2; ASTM D-3, CNGA & NGAA), Statler Hotel, St. Louis.
27-29	Electrical Conference for Petroleum Industry, American Institute of Electrical Engineers, Mayo Hotel, Tulsa.
27-30	Ninth Annual Petroleum Mechanical Engineering Conference, petroleum division of the American Society of Mechanical Engineers, Statler Hotel, Los Angeles.
28-29	Texas Mid-Continent Oil and Gas Association, Baker Hotel, Dallas, Tex.
30	Southern Gas Assoication, conference on transmission management, Shamrock Hotel, Houston.

OCTOBER

1	Southern Gas Association, conference on gas pipeline rights-of-way, Rice Hotel, Houston.
1-2	Standards Engineers Society, annual meeting, Haddon Hall, Atlantic City, N. J.
3-7	ASTM Committee D-2 on Petroleum Products and Lubricants, Sheraton Park Hotel, Washington, D. C.
4-6	Texas Mid-Continent Oil and Gas Association, annual meeting, Plaza Hotel, San Antonio, Tex.
4-6	Petroleum Electric Power Association, twenty-sixth anniversary meeting, Jung Hotel, New Orleans.
5-7	American Institute of Electrical Engineers, Middle Eastern district, Abraham Lincoln Hotel, Reading, Pa.
6-8	Eighteenth Technical Conference on Petroleum Production, Pennsylvania State University, State College, Pa.
7- 8	California Natural Gasoline Association, twenty-ninth annual fall meeting, Ambassador Hotel, Los Angeles.
7-8	American Institute of Mining and Metallurgical Engineers, Pacific Petroleum chapter, fall meeting, Biltmore Hotel, Los Angeles.
10-13	American Association of Oilwell Drilling Contractors, fourteenth annual meeting, Biltmore Hotel, Los Angeles.
10-16	Oil Progress Week.
11-13	American Gas Association, annual convention, Atlantic City, N. J.
12-15	American Chemical Society, national meeting, Chicago Coliseum, Chicago.
12-15	Eighth National Chemical Exposition, Chicago Coliseum, Chicago.

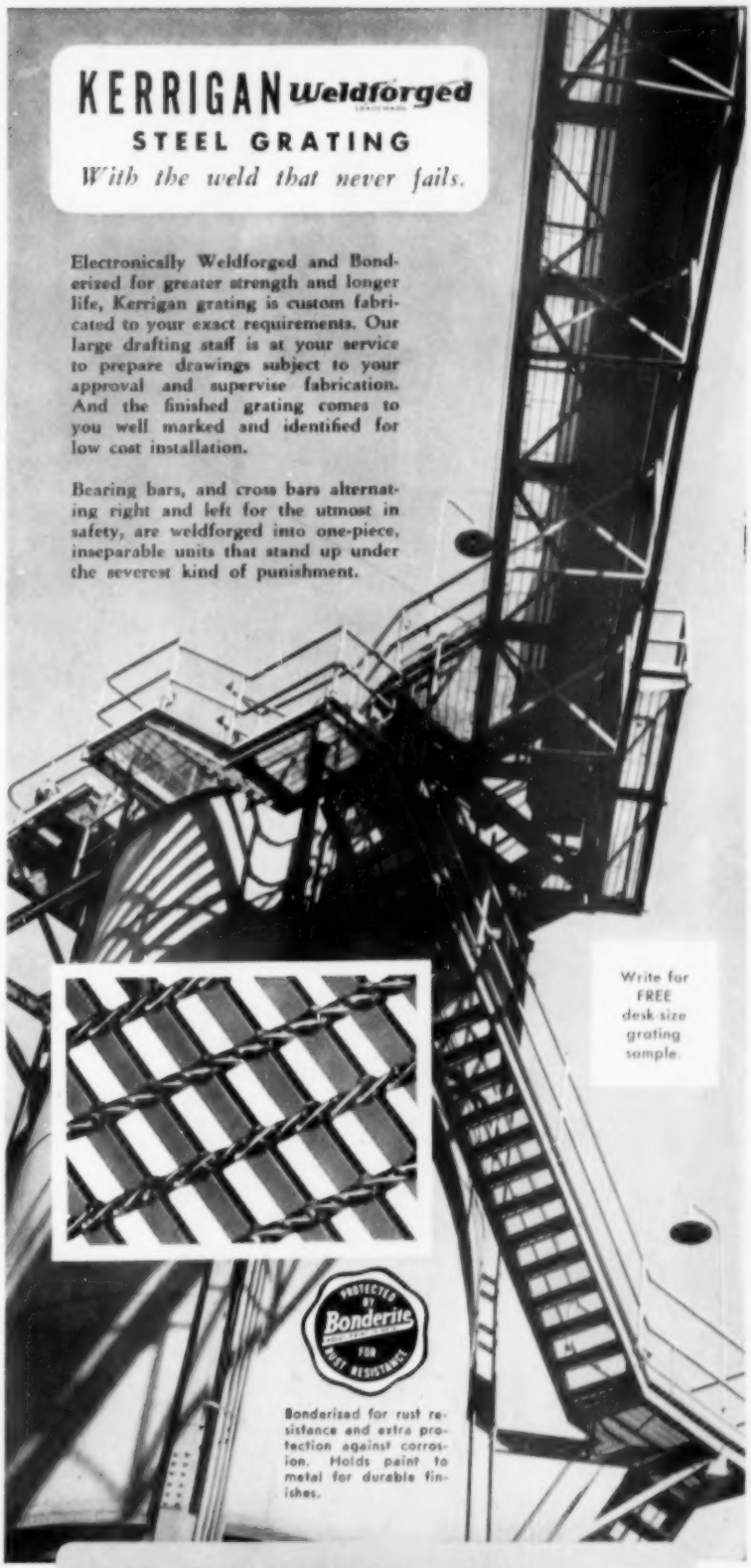
14-15 National Association of Corrosion Engineers, South Central Region, Dallas.
14-17 Permian Basin Oil Show, Odessa, Tex.
17-20 American Institute of Mining and Metallurgical Engineers, petroleum division, fall meeting, Plaza Hotel, San Antonio.
18-19 Joint Lubrication Conference, American Society of Mechanical Engineers and American Society of Lubrication Engineers, Lord Baltimore Hotel, Baltimore.
21-22 Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.
21-23 Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver.
24-26 Independent Petroleum Association of America, annual membership meeting, Mayo Hotel, Tulsa.
25-27 Diesel and Gas Engine Power Plant Operators Conference, sixth annual conference, Oklahoma A. & M. College, Stillwater, Okla.
25-27 National Lubricating Grease Institute, annual meeting, Mark Hopkins Hotel, San Francisco.
26-28 Society of Automotive Engineers, national diesel engine meeting, Statler Hotel, Cleveland.
29 Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.

NOVEMBER

1-3 Geological Society of America, annual meeting, Statler Hotel, Los Angeles.
3-5 Gulf Coast Association of Geological Societies, fourth annual meeting, Rice Hotel, Houston.
4 American Association of Oilwell Drilling Contractors, third annual South Louisiana safety clinic, New Iberia, La.
4-5 Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.
5 Southern Gas Association, conference on field production of natural gas, Herring Hotel, Amarillo.
8-11 American Petroleum Institute, thirty-fourth annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
11-12 American Association of Petroleum Geologists, Pacific section annual meeting, Biltmore Hotel, Los Angeles.
17-18 North Texas Section, American Institute of Mining and Metallurgical Engineers, and Production Committee of the North Texas Oil and Gas Association, symposium on secondary recovery, Wichita Falls, Tex.
18-19 National Association of Corrosion Engineers, fourth annual conference of western region, Hotel Biltmore, Los Angeles.
18-19 Society of Exploration Geophysicists, eighth annual midwestern meeting, Adolphus Hotel, Dallas.
28-Dec. 3 American Society of Mechanical Engineers, Statler Hotel, New York

DECEMBER

2-4 Interstate Oil Compact Commission, winter meeting, Drake Hotel, Chicago.
2-4 American Chemical Society, Southwest Regional meeting, Fort Worth, Tex.
3 Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.
12-15 American Institute of Chemical Engineers, annual meeting, Statler Hotel, New York.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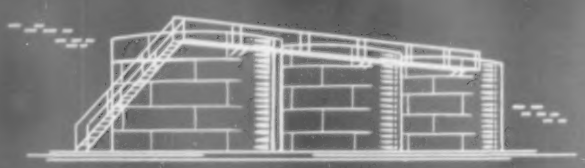
STEEL GRATING
With the weld that never fails.
Electronically Weldforged and Bonderized for greater strength and longer life, Kerrigan grating is custom fabricated to your exact requirements. Our large drafting staff is at your service to prepare drawings subject to your approval and supervise fabrication. And the finished grating comes to you well marked and identified for low cost installation.
Bearing bars, and cross bars alternating right and left for the utmost in safety, are weldforged into one-piece, inseparable units that stand up under the severest kind of punishment.
Write for FREE desk size grating sample.
PROTECTED BY Bonderite FOR RUST RESISTANCE
Bonderized for rust resistance and extra protection against corrosion. Holds paint to metal for durable finishes.
KERRIGAN IRON WORKS, Inc.
General Sales Office — 274 Madison Ave. — New York City

FOR DEPENDABLE PUMPING SERVICE

CHOOSE NORRIS RODS



NORRIS TYPE 30
CARBON MANGANESE SUCKER ROD
For heavy pumping duty, mildly corrosive crude

NORRIS TYPE 35
NICKEL CHROMIUM MOLYBDENUM ALLOY SUCKER ROD
For medium to heavy pumping duty, medium corrosive crude

NORRIS TYPE 40
NICKEL MOLYBDENUM ALLOY SUCKER ROD
For heavy pumping duty, medium corrosive crude

NORRIS TYPE 50
HIGH NICKEL MOLYBDENUM STEEL SUCKER ROD
For heavy pumping duty, severely corrosive crude

PESA
PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION
PARTNERS IN PETROLEUM PROGRESS

W.C. NORRIS, MANUFACTURER, INC.

TULSA, OKLAHOMA

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THE OIL AND GAS
JOURNAL

TULSA, OKLAHOMA

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•

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JOURNALLY Speaking

Why Burmese Handwheels Now Have a New Look

IN the oil fields of Burma, certain of the local residents believe literally in the industry's motto of service to the public. They have been helping themselves to valve handwheels to use on carts and wheelbarrows.

Burmah Oil Co., Ltd., makes every effort to get along with the local population, but it takes a dim view of the illegal removal of its handwheels. For one thing, the loss is not usually discovered until an emergency arises. To discourage the practice, company engineers have produced a triangular handwheel which would make for a rather lopsided trip on a wheelbarrow.

So far, none of the citizens have found any abnormal use for this type of wheel.

Fast Buck, Mexican Style

SPEAKING of illegal, semilegal, or just plain unethical activities, some residents around Juarez, Mexico, were quick to seize the opportunity to turn a fast buck following the recent devaluation of the Mexican peso. It happened this way:

Along the United States border, Pemex buys gasoline in the United States to serve its local outlets. This was all right as long as its selling price was on a par with that in the United States. But after the peso was devaluated, as part of the program to hold down increases in the cost of living, the price of gasoline was kept the same. As a result, gasoline was selling for the equivalent of around 17 cents a gallon. In the El Paso-Juarez area, some opportunists were buying Pemex gasoline in Mexico and taking it back to the United States side where it could be resold at a profit of about 9 cents.

This is a respectable profit even for small-scale operations. It's not much less than some hard-pressed refiners now make on a whole barrel of crude oil.

The Mexican Government now requires licenses for all exports of petroleum products.

Orthographic Pitfalls

ANYONE who notices the frequent differences in spelling of the geographic place names important to the oil business in the Middle East can blame it on some fundamental difficulties in the relationship of the Arabic and English languages.

Sometimes it's Burgan field in Kuwait. At others, Burghan. Bahrein can be Bahrain, Basra occasionally is Basrah, and Mina Ahmadi is Mena Ahmadi. The trouble is that in transliterating an Arabic word, sounds are encountered that have no English equivalent. So, it's often a matter of whose influence is the greatest.

The Middle East is not the only region where the oil industry has spelling problems. In India, Nahorkatiya is a good one to go wrong on. That's Assam Oil Co.'s new field in the northeastern part of the country. Then, for sheer tongue twisting, try Vizagapatam. That's where Caltex is building a new refinery on India's East Coast.

—Dahl M. Duff.

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...and the short

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FPC's gas order can't stand as is

THE Federal Power Commission is going to have to give ground in its fight with independent gas producers. Its drastic order freezing field prices and regulating producers is certain to be postponed, modified, or set aside.

The barrage of protests being fired at it by the industry clearly demonstrates that the order is untenable in many legal and practical respects. If FPC doesn't change it voluntarily, producers should have no trouble finding courts which will enjoin its operation until hearings have been held.

As the order stands, it is just about as sweeping and arbitrary as a bureaucratic regulator could devise. It went whole-hog, with no quarter given or asked. The commission must have known it was inviting a terrific legal battle, and that's what it is about to get.

NOW, EVERY RETREAT from its original position, whether made gracefully or forced on it by the courts, will be a victory for the producing industry. And every concession wrung from FPC, every question tied up in litigation, every action delayed by uncertainty, will be a further demonstration of the imperative need for clarifying legislation.

Possibly FPC deliberately calculated on creating chaos in order to force congressional action. On the other hand, FPC may mean business, may really think it can get away with complete regulation of every detail of gas production. In either case, producers are justified in fighting every inch of the way with every legal weapon.

Fire must be fought with fire. There are so many patently illegal and unworkable aspects that producers would be remiss to comply meekly. At stake is much more than the price of gas. The issues include oil conservation, states' rights, due process of law, and freedom from arbitrary restrictions.

UNLESS FPC GRANTS EXCEPTIONS or postponements, the large producers will seek court injunctions or comply under protest and demand hearings. Some producers may fail to comply, through defiance or ignorance, and wait for FPC to move. In any event the result will be a confused maze of litigation. The protests already filed with FPC outline dozens of ways to tie things up in the courts for years.

It appears now that some projected transmission lines will not be able to get the gas needed to start operations and that some existing lines may lose important segments of their supplies during the uncertainty. If this comes about, perhaps it will convince gas-short consumers that court-made law and arbitrary regulation are not the solution to the problem of an adequate supply of fuel at reasonable prices.

This man didn't have Anchor's complete Marketing Help—

Old Shot here is wishing the boss would wise up and let some specialists take over his plant's product sales. There used to be time for an occasional jaunt in the fields — back when the boss was just concerned with refining. Things might be looking up, though. There was a nice man (scratched Shot behind the ears all the time he was talking) visited with the Boss last night. Told him all about this Anchor outfit . . . how they could take all the Boss's surplus products and marketing worries off his hands. Boss said he was going to call Anchor Petroleum Company in Tulsa (2-7261) today about it.

ANCHOR

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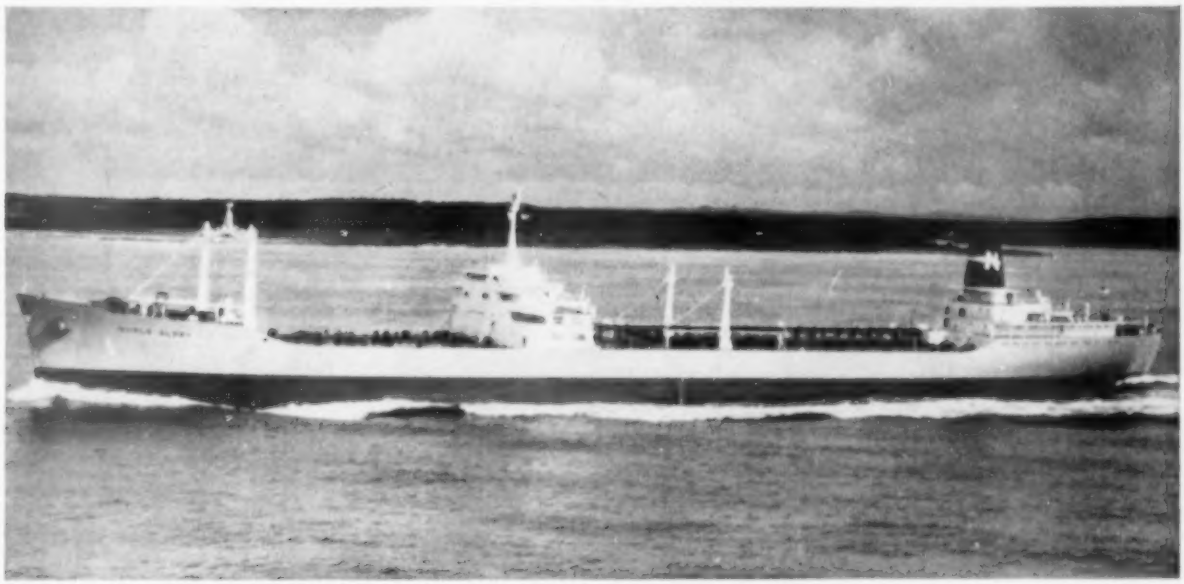
THIS WEEK . . . . . IN THE NEWS



LARGEST U. S.-BUILT TANKER, World Glory, made its triumphant entry into New York Harbor last week to the port's traditional welcome of spouting fireboats, hovering helicopters, and sirens and whistles. Largest tanker to visit the Port of New York, the World Glory is larger than most of the passenger liners afloat today. While the vessel is not the biggest tanker tonnagewise, its capacity of 393,000 bbl. is the largest carrying capacity in the world. Built by Bethlehem Steel Co. for the Stavros S. Niarchos shipping interests, the vessel will enter world charter service for Gulf Oil Corp. after the New York visit.

INTERNATIONAL—Esso Standard completes second producer at Parentis indicating field may be Europe's largest oil reserve. . . . Well tests 1,960 bbl. daily. . . . Field discovery was last March. . . . ¶American Le Duc Petroleum and Ted Jones, Los Angeles independent, launch separate exploration programs in Cuba. . . . ¶New company with British and American backing is formed to explore 1,400 sq. miles in Australia. . . . ¶Pontiac Petroleums stakes location for its first Israeli wildcat 20 miles north of Tel Aviv. . . . ¶General American Oil heads United States group in wildcat undertaking in northern Spain. . . .

INDUSTRY—Gas-producing companies hit FPC with barrage of protests over Rule 174. . . . Order is illegal, companies say. . . . Briefs charge it is too vague, violates Administrative Procedure Act, constitutes unreasonable search and seizure, violates Natural Gas Act, puts companies in position of being unable to comply with the law no matter what action they take. . . . ¶Survey shows oil industry leads the nation in fringe benefits to employes. . . . Benefits of reporting companies average 56 cents an hour per employe, total $1,178 a year. . . . Not only that, oil industry's wages top all other industries. . . . ¶General American makes third purchase in 6 weeks, paying $3,300,000 for J. K. Hughes properties. . . .

EXPLORATION—Shell may add Arizona as nation's thirtieth producing state. . . . Company has already added Nevada and South Dakota this year. . . . Arizona wildcat recovers 3,450 M.c.f. of gas daily in upper Paradox (Pennsylvanian). . . . Well drilling below 4,670 ft. . . . ¶Anderson-Prichard wildcat in Terry County flows 137.7 bbl. of 35° oil in 1½ hours through ⅝-in. bottom-hole choke. . . . Production tentatively identified as Devonian crude. . . . ¶Two strikes reported in little-explored areas of Denver-Julesburg basin. . . . Ryan Oil has show from "J" sand (Cretaceous) in Adams County while New Drilling reports "D" sand strike about 18 miles to the southeast in Washington County. . . . ¶Seven-company group formed to drill wildcat on 10,240-acre tract off Matagorda Island. . . .

GOVERNMENT—Embargo on export of crude petroleum and diesel oil to Communist Europe is lifted. . . . ¶L. F. McCollum, president of Continental Oil Co., heads committee to make study of petroleum production capacity for Government. . . . ¶U. S. is joined by five other nations in protesting Saudi Arabia's oil-transport agreement with A. S. Onassis. . . . ¶Government offers to make some of its patents available to oil industry. . . .

PRODUCTION—Big water-flood operation proves highly successful at Loudon field in Illinois. . . . ¶Portable pump operated by Drilling & Production Co. in the Tejon field south of Bakersfield, Calif., replaces six stationary pumps and results in sizable saving. . . . ¶Buttram Petroleum Corp., Oklahoma City, applies for permit to try new secondary-recovery technique involving injection of L.P.G. before conventional water flooding. . . .

OFFSHORE—Louisiana's claim to 3-league control of coastal waters forces Interior Department withdrawal of 200 tracts from October 13 leasing. . . . Congress will have to settle question of state's "historic" boundary. . . . Lease terms revealed. . . . ¶CATC Group launches tender for service in 97 ft. of water. . . . ¶Magnolia completes five-well rig for use on 11,520-acre lease 8 miles off Jefferson County, Texas. . . .

Industry Objects to Gas Order

- **Biggest complaint is that it put firms in a position where they'll violate the law no matter what they do**
- **With new state taxes going into effect and prices now frozen as of June 7, they ask: Who'll absorb the cost?**

Henry D. Ralph

SOME of the practical problems of oil and gas producers in complying with the Federal Power Commission order regulating all producers and gatherers are pointed out in briefs and petitions now being filed with FPC.

These requests for hearings, reconsideration, postponement, or exemptions also list dozens of legal grounds on which FPC may be taken into court if it attempts to enforce the order as it now stands.

For example, on September 1 the Texas tax on gas production will increase from 5.72 per cent to 9 per cent of market value. Virtually all sales contracts in Texas provide that this tax will be passed on to the purchaser. But the FPC order prohibits any increase in prices. This nullifies the contracts and reduces the price received by producers. The briefs of many of the producers contend this is illegal. Tide Water Associated Oil Co. says it will cost it $100,000 per year.

In Louisiana a production tax of 1 cent per thousand cubic feet went into effect June 22. Sales contracts called for the transmission companies to raise their prices to the extent of any such taxes. But FPC Orders 174 and 174-A froze all field prices as of June 7. Who has to absorb the tax now, producer or purchaser? Nobody knows.

Protests dominate . . . So far only about a dozen producers have filed applications for certificates to sell gas in interstate commerce, most of them individuals and small producers. But twice that number have filed protest briefs demanding hearings, reconsideration, and postponement of the order.

The FPC orders, Nos. 174 and 174-A, require producers to file with it by October 1 all their gas sales prices and contracts and also applications for certificates of public convenience and necessity to engage in the business, accompanied by maps and descriptions of their properties.

If FPC does not modify its order in the meantime or grant exceptions asked in the petitions, it is expected that most of the larger oil and gas companies will file as required by October 1 but under formal protests that the order is illegal and inapplicable to them.

However, a great many producers probably will not file, either in defiance or because the order is so vague that they do not realize that certain of their sales are covered. In such cases, interstate transmission companies would be obligated to stop moving their gas—if and when the situation is officially called to their attention.

The protest briefs already filed outline so many obstacles to compliance and so many objections to the order's legality that it is apparent that gas producers will not know their position for many months unless FPC modifies its stand.

For instance, every producer of casing-head gas is in danger of violating either state proration laws or the FPC order, a situation which the brief of Continental Oil Co. describes as an "unjust and intolerable situation." This comes about because the FPC order prohibits producers from reducing their deliveries of gas below the volume being sold on June 7.

As Continental and others point out in their petitions for reconsideration of the order, state laws change the amount of oil and gas produced from month to month for conservation purposes and to protect correlative rights. In many states material reduction in production has been ordered since June 7.

"Thus," says Continental, "Order No. 174-A is in direct conflict with orders issued under the authority of state laws, and the producer is put in the unfortunate position of having to elect whether to violate the commission's order or those of the several states, and be subject, in either event, to severe penalties."

Pegasus plan endangered . . . A specific and serious example of this conflict with state conservation regulations is cited by Magnolia Petroleum Co., which told the FPC that compliance with the order will wreck its plan for repressuring the huge Pegasus field in Midland and Upton counties, Texas.

Magnolia sells its Pegasus gas to El Paso Natural Gas Co. under a contract permitting it to reduce deliveries at any time by whatever amount of gas is required for specified purposes, including repressuring and injection. The Texas Railroad Commission has ordered Pegasus field shut in on December 1, 1954, unless a gas-repressuring system is in operation by that date. As Magnolia states the situation:

"At the time that Order No. 174-A of the commission was entered, Magnolia Petroleum Co., pursuant to the order of the Railroad Commission, was installing equipment to inject gas into this field to increase the ultimate recovery of oil. This injection program calls for the diversion of 5 to 20 million cubic feet per day of gas from sales to El Paso Natural Gas Co., under contract, which was being delivered on June 7, 1954. The gas so injected will not return to the surface for some 33 years.

"The order of the Federal Power Commission not to decrease the amount of gas being delivered on June 7 seriously impairs the contractual rights of this company and directly conflicts with valid conservation orders issued by the Railroad Commission of Texas.

"Magnolia has spent hundreds of thousands of dollars installing equipment and converting wells to input wells for the purpose of injecting gas, which it cannot do under the order of the FPC, and is required under the order to file application for the diversion of such gas for repressuring and secondary-recovery operations with the FPC.

"Magnolia is placed in the position of violating the valid order of the Railroad Commission if it complies with the order of the FPC. The order thereby interferes with the company's contracts and directly regulates production and gathering, which was prohibited under the Natural Gas Act, and interferes with the orderly conservation statutes of the State of Texas."

Contracts altered . . . A good many producers say they have contracts which provide for delivering variable quantities of gas at different seasons or under specified conditions, but these provisions are nullified by the FPC requirement that deliveries be not less than those of June 7.

In many cases, FPC is being told, this prohibits the producers from meeting their obligations to landowners for delivery of gas, or use of gas for lease purposes.

Liquid hydrocarbons may not be taken out of the gas if this will reduce the volume being delivered on June 7, according to the interpretation of some of the producers.

Some producers are caught in the fix of having short-term interim contracts for the sale of gas for a temporary period but have contracted to deliver this gas to another company when certain facilities are completed.

They complain that the FPC order freezes their temporary contracts and makes them permanent, thereby forcing the producers to default on their contracts for later delivery to another purchaser.

Several producers have contracts to start delivering gas to a new transmission line within the next several months but with the option to withdraw from the agreement by a certain date. They claim that FPC cannot force them to start deliveries against their will even though the contracts were made prior to June 7.

Legality challenged . . . All of the first dozen or so petitions filed by producers contain a series of challenges to the legality of the FPC order.

Some are phrased in legal terminology, some in layman's language, but all carry the strong implication that the companies will ask the courts to enjoin the enforcement of the order as to them unless FPC postpones its effective date or grants them an exception or a hearing.

Most of the companies declare that they are not properly "natural-gas companies" under the act and not subject to FPC jurisdiction because their gas sales are not the same as those of Phillips Petroleum Co. which were under consideration by the Supreme Court. But they admit that the FPC order purports to cover their sales and therefore they have the right to object to its terms and to demand a special hearing as to its application to them.

Some of the allegations of illegality listed in various petitions are:

. . . The order was issued without hearings or prior notice to interested parties, in violation of the FPC's own rules of practice.

. . . The manner of adoption and issuance of the order violates the federal Administrative Procedure Act, which was passed to prevent such sudden and arbitrary action by any regulatory agency.

. . . The requirement to file contracts and documents without a hearing violates the constitutional protection against unreasonable search and seizure.

. . . The order violates the requirement of the Natural Gas Act that companies brought under the act for the first time should be tentatively classified as to the degree of regulation imposed on them.

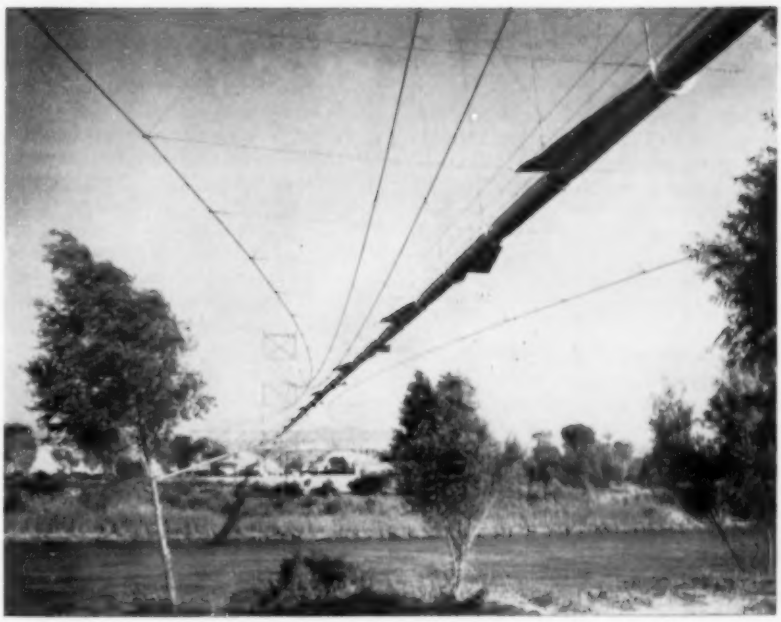
. . . The retroactive feature of the order is illegal. Order 174 was issued July 16 and was superseded by Order 174-A on August 4, but both were retroactive to June 7, the date of the Supreme Court decision in the Phillips case.

. . . Both the Constitution of the United States and the Natural Gas Act are violated by the requirement that producers obtain certificates of convenience and necessity without any proceedings to determine if they are "able and willing" to accept and perform under them.

. . . The order is illegal because it is so vague as to who is covered that producers are unable to determine which, if any, of their activities are subject to it.

. . . It is "retroactive, confiscatory, arbitrary, unreasonable, and violative of all concepts of fair play having due regard to the necessary and normal manner of conducting the activities and business in which oil and gas producers are engaged and thus constitutes a deprivation of property without due process of law."

There are many more legal points



Fins Tame Bucking Pipeline

BLYTHE, Calif. —Engineers have taken the bumps and grinds out of a 30-in. natural-gas pipeline suspended across the Colorado River near here.

The line has been tamed by installing 14 triangular-shaped fins on each side of the pipe. Before the alternate fins were installed, the line vibrated as much as 6 ft. in the middle. It stretches 1,853 ft. from one anchor to the anchor on the opposite bank.

The gyrations were traced to breezes from 3 to 6 miles an hour in velocity. The slight breezes caused eddies that lifted and lowered the pipe. These movements, if continued with no interruption, mounted in intensity. At wind speeds of more than 6 miles an hour, the oscillation cycle was broken and the vibrations began working against one another until the bucking stopped. The fins prevent the eddies, and eliminate the vibrations.

The cause of the bucking was uncovered by Fluor Corp. in the company's Los Angeles laboratories. Fluor obtained some of its preliminary information from El Paso Natural Gas Co., which owns the line running westward until it reaches midstream. The western portion of the line is owned by Southern California Gas Co. and Southern Counties Gas Co. of California.

on which various companies base their charges that the order is invalid, all forecasting bitter litigation if FPC sticks by its guns.

Quite a few of the companies complain that FPC had no moral right to issue such a sweeping and arbitrary order without notice in view of the fact that for 16 years producers have acted in good faith under the repeated declarations of FPC that it had no jurisdiction over them and no intention of trying to regulate them.

Humble's reasoning . . . One of the less legally phrased petitions, and one which summarizes the positions taken by several other producers, is that filed by Humble Oil & Refining Co. Parts of this state:

"Humble has none of the characteristics of a public utility and has no desire or intention to become a natural-gas company subject to the jurisdiction of the commission.

"The company is engaged in finding and producing oil and gas, an economically hazardous business, in which the company has assumed all the risks without obtaining any of the benefits conferred upon natural-gas companies which are subject to the act and regulated by the commission.

"In view of the commission's consistent denial of jurisdiction, Humble entered into contracts for the sale of gas with various natural-gas companies prior to July 16, 1954.

"In these contracts under which Humble is selling natural gas it does not dedicate any gas to public use, but merely undertakes to sell a certain quantity of gas for a stipulated price or prices over stated periods of time and subject to conditions and limitations set out in the contracts.

"In nearly all cases the company has much more gas in the fields from which the gas is sold than the quantities called for in the various contracts.

"For the commission to extend the contracts beyond the periods of time stated in them or to prevent Humble from charging prices agreed upon in these arm's length sales or to require it to continue deliveries from the properties involved in excess of the quantities provided for in the contracts would be tantamount to the commission's taking over management and control of Humble's properties under terms and conditions wholly contrary to those provided for in the contracts and agreed upon by the parties thereto, and clearly would constitute a taking of the company's properties without due process of law and without just compensation contrary to the Fifth Amendment to the Constitution of the United States."

Other objections . . . Almost all of the petitions challenging the order complain that it is so vague that producers can't determine whether they are covered or not.

Some of them say that almost every contract is different, and that they are unable to determine whether or not certain of their gas eventually goes into interstate commerce, or whether their purchasers are under FPC jurisdiction or not.

Such matters, they say, can only be determined after extensive hearings, and if FPC refuses to hold hearings the producers are in danger of violating the law if they fail to comply in every respect or if they make a mistake in interpreting the application of the order.

Another point on which all agree is that FPC has no legal right to treat the June 7 rate as the "price" of natural gas where the contract calls for different prices at different times or under different conditions. The point is repeated in many different ways that escalator provisions and other terms of a contract are all part of the consideration agreed upon by both buyer and seller.

In many different ways various producers argue strenuously that their operations are much different from those of Phillips Petroleum Co. which the Supreme Court found to come under FPC jurisdiction. They accuse FPC of going far beyond the scope of the Phillips case in attempting to regulate all producers.

The Magnolia brief pointed out that in the Phillips case the Supreme Court did not overrule but expressly approved its earlier ruling in the case of Interstate Natural Gas Co. that FPC does not have jurisdiction over physical production and gathering or over sales closely connected with the local incidence of that process. It then said:

"The foregoing rule has a basis in fact and experience. Where public regulation is enforced upon any business, by reason of its nature, it must be a business where the regulating agency can, and shall, provide for a reasonable profit in the operation of the business.

"The Federal Power Commission cannot assure a natural-gas producer of a reasonable profit. . ."

Escape clause issue . . . The FPC attempt to nullify escape clauses is also called illegal. It is argued that producers have a right to choose not to engage in interstate commerce and to make contracts which can be canceled if FPC jurisdiction is applied to them.

The existence of these escape clauses was well known to the FPC when the contracts were filed by the transmission companies, it is pointed out, and failure to object to them then forestalls the commission from invalidating them now.

A great many other practical obstacles and legal objections are raised in the various petitions.

Tanker To Be Built

25,200-ton vessel is first ordered in U. S. since '52

WASHINGTON.—Sinclair Refining Co. ordered a new tanker last week, breaking a 27-month drouth in United States shipbuilding yards for orders for ocean-going merchant vessels.

The ship will be constructed in Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Md., shipyard under an agreement reached with the Maritime Administration.

The vessel will be 25,200 deadweight tons and have a service speed of approximately 17½ knots. It will be almost identical to those proposed for the Navy in a building program recently passed by Congress.

A spokesman for the Maritime Administration explained that the tanker originally was to be built as part of Sinclair's 1956 construction program, but will be started at this time as a move to aid the depressed shipbuilding industry.

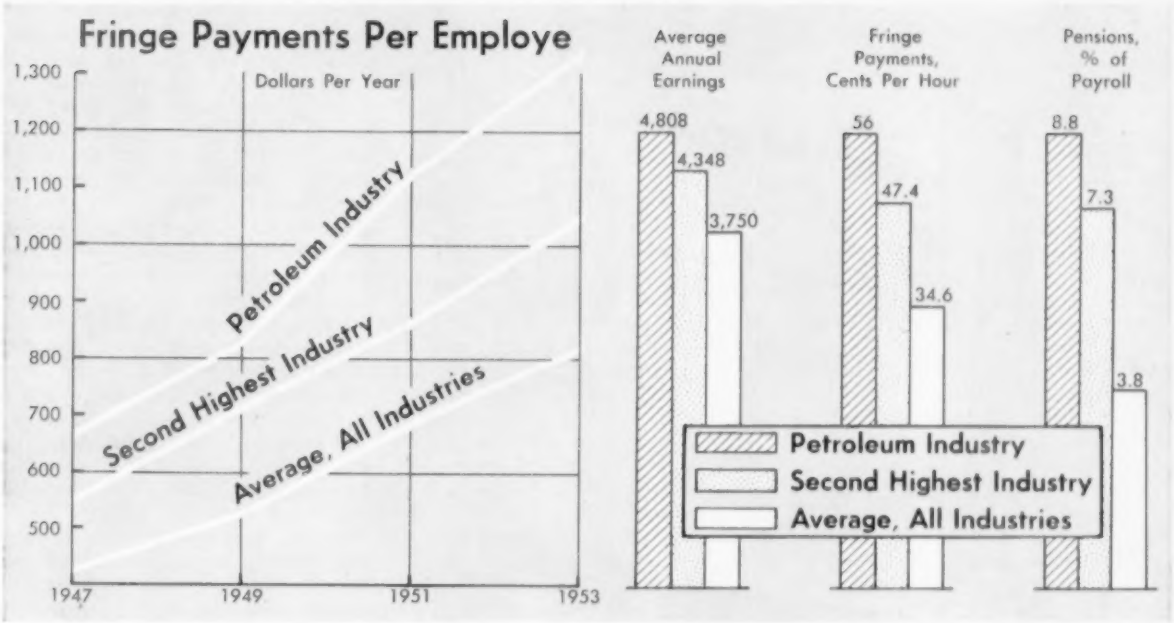
Tulsa Firm Reorganizes

TULSA.—Midwestern Constructors, Inc., Tulsa engineering and construction firm, has been reorganized into two companies.

One firm will retain the present name and handle pipeline construction. F. E. Stanley will remain as head of Midwestern Constructors while C. C. Bledsoe, former secretary and treasurer, will become vice president and treasurer. Ray C. Robertson, formerly assistant office manager, was elevated to secretary.

A new firm, Tuloma Builders, Inc., has been organized to handle gasoline plant, compressor station, and pump station engineering and construction. Clyde Wyant, formerly vice president of Midwestern Constructors, will be president of the new firm and T. F. Hansen, formerly general manager for Midwestern, will be chairman of the board. J. A. Bard, a former Midwestern vice president, will be vice president of Tuloma.

Midwestern Constructors was organized in 1938.



In Fringe Benefits to Employes . . .

Oil Industry Sets the Pace

. . . And the Trend is Upward

THE oil industry not only pays the highest wages of any industry in the country, it also gives its employes the greatest fringe benefits.

These are among the most glaring conclusions of a recent nationwide survey by the U. S. Chamber of Commerce.

The 18 oil companies represented in the survey spent an average of 56 cents per man-hour in 1953 for such things as Social Security, employe insurance, vacation pay, pensions, and other benefits not reflected in the worker's pay envelope, the chamber reported. This average is rivaled only by the 47.4 cents paid by banks and other financial institutions.

In the manufacturing field, no other industry came near the petroleum industry in hourly fringe benefits. Second highest average, according to the survey, was the 39.7 cents per payroll hour spent by manufacturers of chemicals and allied products.

Oil workers get $1,178 . . . Fringe benefits cost the 940 companies covered by the survey an average of $720 per employe in 1953. Average for the petroleum industry was $1,178, followed by $939 for banking firms and $846 for manufacturers of chemicals and allied products.

Although fringe benefits for oil workers were the highest in dollars and cents, such payments amounted to a slightly higher percentage of total payroll in banks and finance and trust companies than in the oil industry. This is accounted for by the fact that oil companies pay higher average wages than do financial institutions.

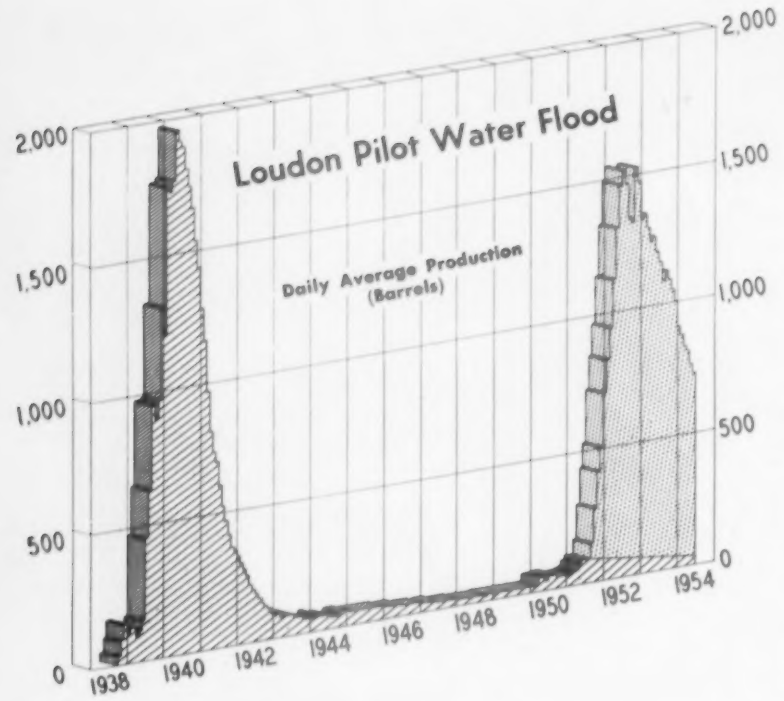
Fringe benefits paid by financial companies amounted to 28.7 per cent of payroll, followed by the oil industry in second place with 24.5 per cent. Dollarwise, the benefits amounted to only $939 for the year in banks and other investment companies, or more than $200 below the $1,178 in the petroleum industry.

Wages paid by the oil industry were tops in the survey at an average of $4,808, followed by those in the printing and publishing industry at $4,348. Pay in the chemical and allied industries ranked ninth, at $4,047. Banks and allied firms were far down the list, at $3,271, well below the $3,750 average for all industries surveyed.

Pensions are high . . . The banking industry was the only one to come shoulder high to the petroleum industry in pensions. Pensions paid by the oil companies represented in the survey amounted to 8.8 per cent of their payroll, compared with 7.3 per cent in the banking industry. Average for all industries reporting was only 3.8 per cent.

Although the oil industry far exceeds others in fringe benefits per employe, oil companies are continuing the upward trend at a faster rate than most other firms covered by recent surveys. Since 1947, hidden payments for oil workers have more than doubled, jumping from $668 a year then to last year's average of $1,349. The 1953 average varies from the $1,178 total previously cited since the 7-year trend represents payments by only nine oil companies which have participated in each biennial survey since 1947.

The comparative survey, covering fewer firms than last year's report, shows manufacturers of chemical and allied products consistently ranked second, with fringe benefits increasing from $556 a year in 1947 to $1,042 last year. The average annual benefit per employe in all industries covered has risen from only $422 in 1947 to $817 in 1953.



Loudon project paying off as . . .

. . . Big Flood Expands

Kenneth B. Barnes

MATTOON, Ill.—Carter Oil Co. in Loudon oil field has one of the really "big time" water-flood operations of the United States.

Currently, this Carter-operated flood is producing 17,700 bbl. of oil daily, of which 8,500 bbl. is directly attributable to the water drive and is above the normal decline expectancy. Carter unfolded details on this operation to The Oil and Gas Journal last week during a special press interview here.

Loudon is one of the largest discoveries touched off in the Illinois basin drilling boom that started in 1937. It was and is decidedly a major field, and a spectacular one.

Principal producing formation is the Cypress (Weiler) sand of the Chester series (upper Mississippian), lying at depth of only 1,500 ft. Loudon has 20,000 productive acres and so far has recovered 176,000,000 bbl. of oil. It runs north-south, 4 miles wide and 15 miles long.

Loudon, like most Illinois fields, had been producing its oil by natural dissolved-gas expansion. This meant to Carter engineers that without a water flood the recovery would be only about 25 per cent of the oil originally in place. Effectiveness of artificial water drive on the Illinois sands is such that about another 25 per cent can be recovered. In round numbers, the Carter engineers figure that the Loudon water-flood program, which was inaugurated in October 1952, will produce an extra 100,000,000 bbl. of oil over normal expectancy.

Expansion . . . Carter started a pilot water flood at Loudon in October 1950. Success of this was immediate (see chart) as oil production rose rapidly to 1,550 bbl. daily. This was virtually as much as the same pilot leases had secured in their flush production days back in 1939-40. The oil production chart for this pilot now indicates, however, that the ultimate recovery for the experimental acreage will be greater under the applied water flood than that indicated by the primary production decline curve.

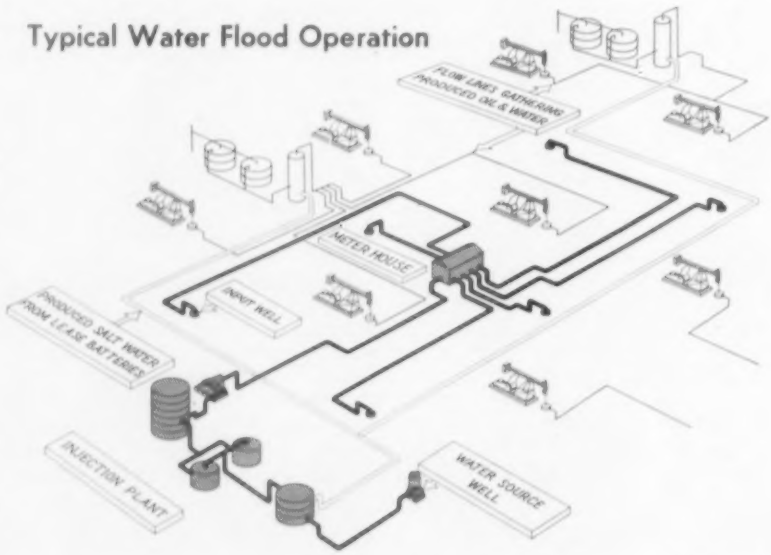
Carter thereafter rapidly expanded the water-flood operations at Loudon. In less than 2 years' time, the acres under flood in the field have jumped to 6,700. The operator is now drilling additional input wells and adding injection and production facilities to take care of 1,000 acres additional flooding.

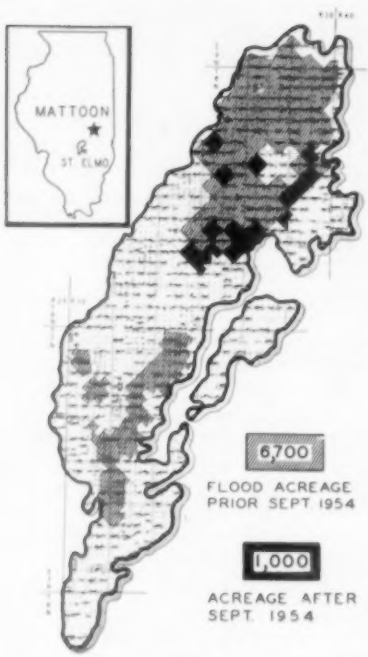
Carter operations at Loudon have been particularly outstanding for the Illinois area. Additional oil-recovery projects were originally started back in the late 1930's with experimental work using the nine-spot "Sunflower" type of gas injection. At one time during the work there was a total of 135 gas-input wells.

Virtually all of the Loudon properties are electrified, with individual pumping units scheduled by staggered time-clock settings.

Well completions, oil metering, and the like are particularly interesting at Loudon because besides the Cypress, also the Paint Creek, Bethel, and Aux Vases sands, and the Devonian limestone produce.

Loudon is in large part composed of 100 per cent Carter properties; small units have been formed in places; elsewhere cooperative flooding is being conducted with other operators. Orig-





inally there were 8 major and 43 independent operators owning properties in the pool.

Important to Illinois . . . Water-flooding is one of the best things that has happened to the oil business in Illinois. The first well-designed water-drive projects really got started only within the last 10 years in the state. It was about that long ago that one water-flood engineer told the writer that Illinois could be regarded as the best prospect for flooding operations in the country. He had made an individual count and found over 800 separate, distinct sandstone reservoirs potentially available for water flooding!

Today, more than 20 per cent of Illinois' average daily oil production of 160,000 bbl. is now being obtained by water drive. Currently, there are approximately 185 water-flooding projects in operation in the state, with many others being planned and installed.

Development of petroleum reserves in Illinois started way back in 1904, in the early shallow fields of Clark, Crawford, and Lawrence counties in the eastern part of the state. The oil industry was then comparatively dormant for many years until the big drilling boom of the southern Illinois basin started in 1937, and discoveries there soon expanded the industry to almost every county in the southern half of the state.

Benton, Salem . . . Other exceedingly large and highly developed water-flood operations in Illinois are those under the leadership of Shell Oil Co. in Benton field, Franklin County *(The Oil and Gas Journal, August 4, 1952)* and The Texas Co. at Salem field, Marion County *(The Oil and Gas Journal, December 7, 1953)*.

American Expands

Pan Am-Standard merger raises status of company

NEW YORK.—American Oil Co. has come out of the recent merger of Pan American Petroleum & Transport Co. with Standard Oil Co. (Ind.) as a wholly integrated company with its own production, refining, and pipeline facilities.

American Oil, former marketing subsidiary of Pan American, becomes a direct subsidiary of Indiana Standard and will operate refineries at Baltimore and Savannah, Ga., as well as a new 35,000-bbl. refinery now under construction at Yorktown, Va.

The company will also continue to market the products of the Texas City, Tex., refinery of Pan American Refining Corp. American's crude production, gas production, and pipeline facilities will be operated by other subsidiaries, Pan American Production Co., Pan American Gas Co., Pan American Pipe Line Co., and Fairfax Pipe Line Co.

Affiliated companies which will be taken over by American and dissolved include Pan American Refining Co. of Delaware, Mexican Petroleum Corp., Mexican Petroleum Corp. of Georgia, Lord Baltimore Filling Stations, Inc., and May Fuel Oil Corp.

For names of company officials see The Journal's personals on pages 154, 155, and 156.

Merger Vote Awaited

HOUSTON.—Merger of Tennessee Production Co. into Tennessee Gas Transmission Co. will be voted on by stockholders of the two companies October 6. The merger already has been approved by directors of the two firms.

According to Gardiner Symonds, Tennessee Gas president, the merger would give the parent company direct ownership of some of its natural-gas reserves, free funds not needed in transmission operations for development of oil and gas reserves, and provide economies of operation.

Tennessee Production, originally known as Coast Co., formerly was wholly owned Tennessee Gas subsidiary. A little more than half of the company's stock was sold to the public in 1952.

Industry Briefs

FORT WORTH.—Gulf Oil Corp. 1 Northrup, which recently established a Texas depth record, was nearing its projected depth of 18,500 ft. last week. The well was drilling below 18,224 ft. in shale, dolomite, and sand. The wildcat is located in Section 33, Block 50, T-8, T&P Survey, Reeves County, West Texas. Parker Drilling Co. is the contractor.

BATON ROUGE.—Louisiana's daily allowable crude-oil production for September has been set at 592,135 bbl., which is 20,555 bbl. daily below the August figure of 612,690 bbl. The September figures in barrels by districts are Houma, 134,750; Lafayette, 132,831; Lake Charles, 57,350; New Orleans, 158,140; Monroe, 50,364; and Shreveport, 57,700.

OKLAHOMA CITY.—Gibraltar Oil Co. has acquired all producing properties and undrilled leases of William R. Whittaker Co., Ltd., and Majorol Oil Co. in the western half of the United States. The expanded company will continue to headquarter here. A division office is planned at Denver.

NEW YORK.—The petroleum in-dustry now pays nearly five times as much tax as it did 20 years ago. The tax bulletin of American Petroleum Institute shows that the industry paid almost $5,000,000,000 in taxes in 1953 compared to $1,004,824,000 paid in 1933.

DEARBORN, Mich.—Standard Oil Co. (Ind.) will build a distribution terminal 6 miles southwest of here to serve eastern Michigan and part of Detroit. The terminal will be served by Standard's new products pipeline from its Whiting, Ind., refinery and will be able to handle 134,500,000 gal. of products yearly.

WASHINGTON.—Clarence E. Davis, solicitor for the Interior Department, has been named undersecretary of the Interior and will be sworn in September 1. He succeeds Ralph A. Tudor, who is resigning to return to private business.

SPOKANE, Wash.—Spokane Gas & Fuel Co. has been awarded a 25-year franchise to distribute natural gas in the city when it becomes available. The utility currently supplies about 6,550 customers with manufactured gas. Spokane Gas & Fuel is owned by Ray C. Fish and associates, Houston. Fish also is chairman of Pacific Northwest Pipeline Corp.

Shelf Auction Lags

Interior Department withdraws listing for October lease sale to delete tracts in area clouded by Louisiana claim

WASHINGTON.—Louisiana's claim to a wide strip of the Gulf of Mexico has thrown a monkey wrench into the Interior Department's machinery for an early auction of oil and gas leases on the Continental Shelf.

A list of 200 tracts off Louisiana for the October 13 offering was sent to the National Archives for printing in the "Federal Register" and then withdrawn a few hours later for revision. Some of the tracts nominated by interested oil operators fell inside the seaward boundary recently claimed by the Louisiana Legislature.

Many tracts are expected to be deleted from the list so the department may hold aloof from the hassle over the twilight zone created by Louisiana's claim. If the state insists on the 3-league boundary, the issue will have to be settled by Congress in the form of a clearer definition of the "historic" boundary of the state, or by the Supreme Court.

The Louisiana Legislature quietly passed an act recently which defines the state's "coast line" on the basis of a 1895 act of Congress. The act extends the "coast line" seaward as much as 25 miles in spots and classifies the waters between this line and the actual shore as inland waters. With this as a base, Louisiana claims an additional 3 leagues beyond the legislated coast line to the state's seaward boundary *(The Oil and Gas Journal, August 2, page 54)*.

Lease terms . . . In the brief period in which the department's announcement was a public document it was possible to learn the conditions under which the first federal leases in the outer Continental Shelf will be issued.

Bids are to be opened October 13 and leases will be awarded to the qualified bidder of the highest cash bonus, in the same manner as public land leases are made under the Mineral Leasing Act. However, in the case of the shelf lands, the department has set a minimum bonus figure of $15 per acre. It is confidently expected most offers will be much higher.

A flat royalty of 16⅔ per cent has been set on production. The rental is set at $3 per acre per year. Where there is production, royalties must amount to $3 per acre per year or the difference made up by the lessee. No oil payments, over-riding royalties, logarithmic or sliding-scale royalties will be permitted.

Bids must be for a least a full tract. Tracts range from 1,250 to 5,000 acres. A separate bid must be made for each tract, and bids must show the area, official leasing-map number, tract number, total amount bid, amount per acre, and the amount submitted with the bid, the last to be one-fifth of the total amount bid, in cash, money order, certified check or bank draft.

Crude Embargo Lifted

WASHINGTON.—Crude petroleum and diesel oil have been removed from the "Battle Act" list of exports prohibited to the communist countries of Europe.

Highly refined petroleum products and all types of producing and processing equipment are still on the embargo list.

While crude and diesel oil and a few of the less important products now may be shipped to Communist Europe, they will remain "under lesser but nevertheless careful control," Director Harold E. Stassen of the Foreign Operations Administration said.

No changes have been made in the controls over shipments to Communist China, barred from legal access to a much longer list of products.

The embargo is maintained under the authority of the Battle Act of 1951. The changes just made were in accordance with an agreement reached at a recent conference with the 15 other governments which are cooperating in a "cold war" program to withhold materials and products which might contribute to military strength of Russia and her satellites.

The shortened list prohibits the shipment of compressors, pumps, valves, pipe and tubing, and equipment for oil-well drilling, oil refining, production of lubricants and treatment of natural gas. Also barred are gasoline, kerosine, lubricating oils, blending agents for aircraft fuels, tetraethyl lead and butyl synthetic rubber.

Tax Loss Stressed

Oklahoma losing $500,000 monthly because of imports

WASHINGTON.—Oklahoma is losing $500,000 a month in gross production taxes due to cuts in allowable production attributed to imports of foreign crude, Oklahoma Congressman John Jarman told Congress last week.

Jarman warned the return of Iranian oil and possible increases in imports may call for congressional action next session. Jarman said Oklahoma's allowables were slashed nearly 50,000 bbl. daily between May and August as result of imported oil.

At the same time, both the Independent Petroleum Association of America and the Independent Refiners Association of America asked for permission to submit their views on the oil industry's problem to the Cabinet Committee on Energy Supplies and Resources Policy.

Spokesmen for both organizations said they believe the committee will come up with a recommendation for some positive action concerning imports. The committee was named by the President and is headed by Mobilization Director Arthur S. Flemming.

While the IPAA is concerned primarily with the problem of imports, the IRAA urged Flemming to consider the economic problems of maintaining an adequate reserve of refinery capacity for use in the event of emergency, the mechanics for assuring adequate depreciation of facilities, and problems related to inadequate profit relationships.

McCollum Named

Conoco president appointed chairman of NPC committee

WASHINGTON.—L. F. McCollum, president of the Continental Oil Co., will head a 24-man committee to make a National Petroleum Council study of petroleum productive capacity for the Oil and Gas Division. Hines H. Baker, president of the Humble Oil & Refining Co., will be vice chairman

The committee was appointed by Walter S. Hallanan, NPC chairman, on the request of the OGD for data by PAD districts on the availability of

crude oil and natural gas, liquids, and on production, and reserve producing capacity as of July 1, 1954.

Other committee members are: B. C. Belt, Gulf Oil Corp., Houston; E. F. Bullard, Stanolind Oil & Gas Co., Tulsa; H. S. M. Burns, Shell Oil Co., New York; Howard A. Cowden, Consumers Cooperative Association, Kansas City; E. DeGolyer, DeGolyer & MacNaughton, Dallas; J. C. Donnell, II, Ohio Oil Co., Findlay, Ohio; Paul Endacott, Phillips Petroleum Co., Bartlesville; W. W. Flenniken, Rocky Mountain Oil and Gas Association, Denver; R. G. Follis, Standard Oil Co. of California, San Francisco; Jake L. Hamon, Dallas; B. A. Hardey, Shreveport; A. Jacobsen, Amerada Petroleum Corp., New York; B. Brewster Jennings, Socony-Vacuum Oil Co., Inc., New York; J. P. Jones, Pennsylvania Grade Crude Oil Association, Bradford; A. C. Mattei, Honolulu Oil Corp., San Francisco; R. L. Milligan, Pure Oil Co., Chicago; E. E. Pyles, Monterey Oil Co., Los Angeles; Ralph O. Rhoades, Gulf, Pittsburgh; P. C. Spencer, Sinclair Oil Corp., New York; William M. Vaughey, Independent Petroleum Association of America, Jackson, Miss.; W. K. Warren, Warren Petroleum Corp., Tulsa; Robert E. Wilson, Standard Oil Co. (Ind.), Chicago; and Jack Woodward, Texas Independent Producers and Royalty Owners Association, Dallas.

Two-bit booklet tells . . .

. . . Where to Drill Offset

WASHINGTON.—Following its recent appeal for new inventions to aid in national defense, the Government reciprocated last week by offering some of its own patents to private industry.

The Government's generous offerings to the petroleum industry, included in a big variety of inventions being made available to the public, may not prove so revolutionary as the nonfluid gasoline it requested a week earlier *(The Oil and Gas Journal, August 23, page 100)*. But some of the government-owned patents are intriguing.

One of the patented devices, for example, may help you decide where to stake your next offset well. Another will indicate how deep the pay zone is in an old well which has been cased.

Developed by U. S. employes . . . Several inventions of potential interest to men in the oil and gas industry are among the 6,000 developed by federal employes and now being offered for commercial use on a nonexclusive license basis. Patents offered for public use are being indexed and listed by the Government Patents Board in a series of seven volumes, the first of which, dealing with Government-owned inventions in the field of instrumentation, has just been issued. The first book lists 775 inventions, many of which pertain to atomic energy.

Specifications of any of these inventions may be obtained from the Commissioner of Patents for 25 cents. Most of the inventions are royalty-free.

Applications to use any of the government's inventions should be addressed to the agency administering the patent, generally the Interior Department for those relating to oil and gas.

Described below, with most of the government phraseology deleted, are some of the inventions available to the oil and gas industry, along with the patent number and title which must be given to secure copies of patent papers, date of the patent, and name and agency of the inventor:

Geological device . . . Method for determining the subterranean extension of geologic bodies, 2,440,693, May 4, 1948, Frederick W. Lee, Interior Department: The invention is an electrical method of tracing geologic formations, using drill holes and surface observations to determine the most promising location for your next well (all for a quarter).

Fluid finder . . . Liquid level indicator, 2,633,021, March 31, 1953, Kurt B. Bredschneider and Hanns Schappert, Interior Department: The indicator is used in finding the level of fluid in a vessel such as a tank holding asphaltic products of hydrogenation. Streams of gas are injected into the vessel above and below the liquid level and top of the liquid is detected from the pressure differential.

Casing yardstick . . . Measurement apparatus, 2,580,457, January 1, 1952, Stanley E. Norris, Interior Department: This is a magnetic device which slides down the side of the casing and measures its length for geologic study.

Liquid level detector . . . Instrument for locating the liquid level in wells, 2,610,506, September 16, 1952, David B. Taliaferro, Clifford F. McClung, and Fritz G. Mueller, Interior Department: This device utilizes a hollow float and electrical contacts to indicate fluctuations in liquid level.

Water recorder . . . Moisture content recorder for gases under pressure, 2,629,253, February 24, 1953, William M. Deaton, Interior Department: This detects water vapor in natural gas by means of a temperature equalizer and electrical resistance.

Helium finder . . . Apparatus and procedure for the determination of helium in gases, 2,601,272, June 24, 1952, Ellis M. Fros, Jr., Interior Department: This involves use of an absorbent capable of removing nonhelium constituents from a gas mixture.

Tanker Deal Hit

Other nations join U. S. in protesting contract

WASHINGTON.—Five major maritime countries have joined the United States in protesting the agreement between Saudi Arabia and A. S. Onassis giving Onassis what might eventually become a monopoly on the water transport of Saudi Arabian oil.

The six countries have not jointly protested but, acting individually, Britain, Norway, Denmark, Sweden and Japan have also made representations to the Saudi Arabia Government that the deal is monopolistic.

Situation watched . . . The United States protest on the agreement was filed some months ago, but a State Department spokesman said last week the matter is being kept under consideration constantly. The department contended that the agreement was not only monopolistic but was contrary to all established international shipping practices.

Meanwhile, the Arabian American Oil Co. is understood to be working to secure modification of the contract, under which Saudi Arabia would receive 21 cents per ton on all oil shipped in Onassis tankers.

No oil has yet ben shipped under the agreement, but the first Onassis tanker is due to arrive at Saudi Arabia in the near future, and a showdown on the situation may develop if Aramco refuses to make cargo available to it.

Arapahoe Line Approved

WASHINGTON. — The Office of Defense Mobilization has approved accelerated amortization of Arapahoe

WATCHING WASHINGTON

Bertram F. Linz

Government Gravy Train

Congress has been investigating the windfall profits of builders who secured federal housing loans in excess of the actual cost of construction and pocketed the difference.

But the Government itself is getting a pretty substantial windfall from the oil and other industries, about which nothing has been said.

Several million dollars a year is coming into the Treasury from employers in the shape of excess social security taxes. The normal procedure of refunding these payments would be followed except that it appears impossible to develop a workable formula.

Here's how this "gravy" for the Government develops: When a worker takes a new job, both he and the employer pay the tax, currently 2 per cent for each on the first $3,600 of earnings. Workers who change jobs during the year start paying the tax all over again each time they move, as do their successive employers.

At the end of the year the worker may have paid in more than the $72 required under the law, and his several employers jointly also may have exceeded that amount. The worker can get a refund of his excess payments, but there is no provision for refund to the employers.

Justice Clears Record

Just to keep the record straight, the Justice Department has admitted there was little foundation for the charges made during the 1952 presidential campaign that antitrust suits against the oil and other industries during the 20 years of Democratic administration were based on unsound charges.

About 150 such cases were pending when the Republicans took office in January 1953. Department officials said all these cases would be reviewed and intimated that many of them would be thrown out. But, Assistant Attorney General Stanley N. Barnes, head of the antitrust division, has disclosed that 130 cases have been intensively reviewed and only five have been dismissed.

None was dismissed because of faulty charges. Three were dropped because of changed circumstances which made litigation unnecessary and the other two because the courts so limited the introduction of the government's evidence that adequate relief could not possibly be obtained.

During the past year considerable progress was made toward bringing the antitrust docket up to date. Forty-eight civil actions and 18 criminal cases were terminated, 32 of the former by consent decrees and 17 of the latter by pleas of guilty or nolo contendere (no defense), Barnes reported. When cases went to court, the Government didn't do so well, winning only 6 of 12 civil suits decided.

Census to Count Noses

The Census Bureau next year will ask oil and gas operators to furnish detailed data on their 1954 production operations, in the first census of mineral industries to be taken since 1939.

Operators will be asked to give detailed information on their production, employment, payrolls, fuel and power consumption, etc., which eventually will be embodied in statistics covering every county in every state in which oil or natural gas is produced.

At the same time, some 300,000 manufacturing establishments, including oil refineries, will be asked for data which will include figures on raw materials used. About 2,750,000 retail, wholesale and service establishments, including distributors of petroleum products, will be required to report on their volume of business, inventories, credits, etc., in the first such census to be taken since 1948.

Sometime early next year every business establishment known to the Government will receive lengthy questionnaires by mail. The whole canvass will be conducted by correspondence in the interest of economy, but even so it will cost an estimated $8,430,000 to collect the figures. More money will be needed for their compilation.

Two of the three surveys have been taken at intervals for more than a century. Figures on manufacturing were first taken for 1809 and for the mineral industries for 1839. The census of distribution is relatively new, having been instituted in 1929.

Pipe Line Co.'s $24,377,000 crude line and right-of-way which will extend from Merino, Colo., to Humboldt, Kans. The ODM order also covers 40 per cent of $764,000 for the company's storage facilities.

Quick write-off has been granted the Pecos Growers Gas Co. for 25 per cent of its $1,878,237 natural-gas transmission line and supply laterals in Pecos and Reeves counties, Texas.

MEETINGS

Shale-Oil Panel Slated

GLENWOOD SPRINGS, Colo.—A symposium on "Oil Shale and Shale-Oil Processing" will be presented here September 13 during the opening day of the 4-day national meeting of the American Institute of Chemical Engineers.

The papers of the symposium include: "Advancements in Fuels Production from Oil Shale," Clyde Berg, Union Oil Co. of California, Los Angeles; "Thermal Extraction of Oil Shale Kerogen," W. R. Thompson and C. H. Prien, Denver Research Institute, University of Denver; "Thermal Processing and Chemical Treating of Colorado Oil Shale," Boyd Morris and Russell J. Cameron, U. S. Bureau of Mines, Rifle, Colo.; "Catalytic Cracking of Shale-Oil Coke Distillates," C. K. Viland, Tide Water Associated Oil Co., San Francisco, and "Recycle Hydrogenation of Shale-Oil Crudes," R. L. Crecelius, E. O. Kindschy, C. B. Hopkins, H. C. Carpenter, C. M. Frost, E. R. White, G. C. Freeman, and P. L. Cottingham, U. S. Bureau of Mines, Laramie, Wyo.

L.P.G. Symposium Announced

ST. LOUIS.—A symposium on methods for testing liquefied petroleum gases will be held at the Statler hotel here September 27-28.

The symposium is sponsored by the petroleum products and gaseous fuels committees of the American Society for Testing Materials, along with the Natural Gasoline Association of America and the California Natural Gasoline Association.

General chairman of the symposium is B. J. Heinrich, Phillips Petroleum Co., Bartlesville, Okla.

The 2-day program is to include discussion of every known field and laboratory test for determining the quality and physical characteristics of liquefied petroleum gases. Thirty-four technical papers will be presented at the meeting.

CANADA

Refinery Dedicated

Premier Douglas defends controversial farmout deal

REGINA, Sask.—H. L. Fowler, general manager of Consumers' Co-Operative Refineries, Ltd., when the Regina refinery was just a 500-bbl. per day skimming plant last week turned a valve to put a new and enlarged 12,000-bbl. daily refinery on stream.

The official ceremony concluded a 2-year, $7,500,000 construction program that has increased the daily capacity of the refinery from 6,500 bbl. to 12,000. The program included the addition of a new 6,500-bbl. daily vacuum unit, a 5,000-bbl. U.O.P. fluid cat cracker, a high-pressure gas-concentration unit, and a polymerization unit, in addition to auxiliary facilities.

Saskatchewan's Premier T. C. Douglas, guest speaker at the ceremony, reviewed the history of the refinery from a small skimming plant in 1934 to the third largest refinery in the province and paid tribute to the "loyalty, support and patronage" of the thousands of members of the cooperative.

Controversy . . . The premier also touched on the controversial farmout agreement made by the government with Consumers' on crown reserve acreage in Smiley field. Douglas conceded the government has been criticised for the deal but said it has come from "those who do not believe that the resources of a province belong to the people of the province."

Criticism from the oil industry was voiced because the farmout agreement was made instead of the usual crown auction of government lands. Douglas said the government makes "no apology" for the agreement and added, "I am exceedingly proud that a great number of citizens of the province through their cooperatives are participating in the development of their own oil reserves."

Farmout Leasing Offered

REGINA.—A farmout agreement with the Government may win operators leases on 12 tracts in the Coleville-Smiley-Eureka Viking oil and gas fields.

The Department of Mineral Resources is offering the farmout deal as an alternative to a cash bonus for leases in the fields.

Under the farmout arrangement, the operator would submit a bid on what percentage would be paid the Government in addition to the normal crown royalty after capital development and operating costs have been met.

Bids on the tracts, which cover 9 sections, will be opened October 7 and will be awarded within 10 days.

Gas Studies Begun

Engineering on Alberta's gathering system started

CALGARY, Alta.—A 300-mile, big-inch gathering system through which all gas being exported from Alberta will flow is being planned.

Engineering work on the system has been started through a joint venture formed by two firms, Dutton, Williams Brothers, Ltd., and Mannix, Ltd. Construction will start in early 1955. The system will be built and owned by Alberta Gas Trunk Line, Ltd., a firm authorized by the Trunk Line Act of last April to gather all Alberta gas destined for export.

The only line the system will initially serve is the 2,200-mile Trans-Canada line, from Alberta to Ontario and Quebec. This $300,000,000 line will be the longest ever laid.

Trans-Canada is Alberta Gas Trunk's only prospective customer. However, the system will be extended to any gas field producing gas for export. Ralph Will is president of Alberta Gas Trunk and William F. Knode is vice president.

M. A. Dutton is manager and sponsoring officer of the joint venture of Dutton, Williams Brothers, Ltd., and Mannix, Ltd., David R. Williams, Jr., vice president of Williams Brothers Co., represents his firm in the joint venture. C. A. Callahan is project manager. C. H. M. Burnham, former vice president and chief engineer of Panhandle Eastern Pipe Line Co., is in charge of engineering.

Midale Spacing Revised

REGINA.—Eighty-acre well spacing has been approved for the Midale medium-gravity oil field in southern Saskatchewan, and the limits of the field have been greatly expanded.

Wells will be located near the center of odd numbered subdivisions so that each new well will diagonally offset previous wells. Production will be based on 40-acre spacing. The new limits expand the size of the field from 5¼ sections to 40 sections. The field is located about 26 miles southeast of Weyburn and 30 miles north of the North Dakota border.

Natural-Gas Briefs

OMAHA.—Northern Natural Gas Co. proposes to build facilities costing $131,000 to provide natural gas to Northern States Power Company of Minneapolis for use in its Black Dog Lake power station near St. Paul. Northern would provide a minimum of 5,000,000 cu. ft. of gas the first year and 10,000,000 cu. ft. per year thereafter.

MINNEAPOLIS.— Montana-Dakota Utilities Co. has received permission to add over $2,000,000 worth of facilities to its system in Montana, North Dakota, and South Dakota. The company will spend $893,901 to build 56 miles of distribution lines in Hettinger and Stark counties North Dakota, to supply gas to Regent, Mott, New England, and Lefor N. D. The second project will cost $1,366,944 and will add 49 miles of line and an additional 440 hp. compressor station to the company's system in Montana and South Dakota.

HOUSTON. — Trunkline Gas Co. proposes to build a 6,350-hp. compressor station on its natural gas supply line at Edna, Tex. The station would contain only one compressor unit and would cost $1,563,800. Trunkline says that it needs the station to obtain maximum quantities of gas available under its Texas contracts.

PITTSBURGH.—Manufacturers Light & Heat Co. will build 61 miles of natural gas transmission line and add 1,760-hp. to its compressor power on its system in Ohio, Pennsylvania, and West Virginia. The project, which will cost $4,099,250, will be located in Columbiana, Belmont, and Monroe counties, Ohio: Ohio County, West Virginia, and Beaver, Washington, Allegheny, and Westmoreland counties, Pennsylvania. The facilities will be in operation for the 1954-55 heating season.

DALLAS.—Lone Star Gas Co. has received the green light for construction of pipeline facilities for the storage of natural gas in New York City field in Clay County, Texas. The project includes a 2,640-hp. compressor station, 5 miles of 12-in. pipeline, and will cost $1,144,617. Estimated maximum input into the storage reservoir is about 20,000,000 cu. ft. daily and the company expects to be able to withdraw up to 80,000,000 cu. ft. daily.

L.P.G. Flood Proposed

Buttram hopes to recover 9,000 bbl. per acre in Camp Hill field by injecting propane-butane mixture ahead of water

Robert J. Enright

PALESTINE, Tex.—A new secondary-recovery technique involving large-scale injection of L.P.G. prior to conventional water flooding may be tried soon in the 660-acre Camp Hill field southeast of here in Anderson County.

The new flooding technique is expected to recover 9,000 bbl. per acre in a five-spot pilot project covering 10 acres. The field currently has no commercial oil production.

An application to conduct such an operation in the Carrizo-Wilcox formation in the field was laid before the Texas Railroad Commission last week by Buttram Petroleum Corp., Oklahoma City, which is headed by Frank Buttram.

Although Camp Hill has no production, oil in place is estimated at 1,900 bbl. per acre-foot. To date, the high viscosity of the oil (34 cp.), low reservoir pressure (70 psi.), and unconsolidated nature of the sand have stymied efforts to produce the oil.

Buttram believes that by injecting a mixture of 70 per cent butane and 30 per cent propane into the 525-ft. Carrizo-Wilcox:

. . . **Viscosity** of the crude will be reduced—at least in the vicinity of the well bore.

. . . **Residual** or nonrecoverable oil content will be reduced, and thus,

. . . **Premature** bypassing of water tendency also would be reduced.

The theory is that the L.P.G. would create a fluid front ahead of the water and bring about a more favorable permeability relationship to water and oil.

Buttram plans to inject not less than 10,000 bbl. of L.P.G. at a rate of about 260 bbl. daily. Following this, fresh water would be injected at about the same rate.

Field facts . . . The Carrizo-Wilcox in the Camp Hill structure originally contained a gas cap and the drive presently is solution gas and gravity drainage. Gravity of the oil is 20°, average porosity 35 per cent, and average permeability 1,600 md.

Ratio of gas-cap volume to oil-zone volume is 30 per cent. Estimated average thickness of the oil zone is 35 ft. and of the gas zone 15 ft. Connate water content approximates 30 per cent. Formation factor volume is 1.00.

Buttram plans to use two existing wells as injection wells, and drill the remaining two inputs and the producer, plus a water supply well.

He proposes to whip the problem of the unconsolidated sand with a venturi-jet pump, to which he claims exclusive rights. The pump will not "sand up or cut out easily." This pump, he said, has already been used on one of the existing wells. He believes that it would perform efficiently if there were sufficient reservoir energy to push the oil to the well bore.

Deep Test Is Strike

Terry County well testing 35-degree Devonian crude

MIDLAND.—The search for deep oil throughout West Texas fields has netted another discovery.

First tests at the new find have indicated the possibility of flush production from what has been tentatively identified as Devonian pay. Location is in southwestern Terry County, 30 miles from nearest Devonian wells, in a previously unexplored area.

The prospect is Anderson-Prichard Oil Corp. 1 Oil Development Co. Operators called top of the Devonian at 12,750 ft., by samples, drilled to 12,797 ft., then tested the entire section. Oil followed water blanket to the surface in 50 minutes and the well was flowed into pits for 30 minutes to clean. Turned into tanks through 5/8-in. bottom-hole choke, it produced a total of 137.7 bbl. of 35° oil in 1½ hours. Gas-oil ratio was not reported but flowing pressure reached 5,360 psi. When the testing tool was closed the drill stem was full of clean oil, with no water in evidence. Operators then ran electrical surveys.

Nearest production . . . The Canyon Reef produces in Wellman field, 4½ miles to the southeast, and Devonian wells are indicated on the accompanying map by the darker shaded areas. These are Bronco field in extreme western Yoakum County and Russell field in northwestern Gaines County.

Hunt Oil Co. 1 Johnson, a Devonian prospect due west in Yoakum County, is also shown on the map here. Operators of 1 Johnson have released the rig and are testing further from perforations between 11,438-11,475 ft., where the well has been making around 20 bbl. of oil an hour.

Dallas Firm Buys Again

DALLAS. — General American Oil Co. of Texas has closed a $3,300,000 purchase of all oil properties of J. K. Hughes Oil Co., Mexia, Tex.

This was the third multimillion-dollar oil purchase by General American in the past 1½ months. The company paid $27,000,000 for producing, refining, pipeline, and marketing facilities of Deep Rock Oil Corp., Tulsa, early in July and followed this immediately with a $4,300,000 purchase of Canada Southern Oils' share of heavy crude production in Coleman-Banff field in central Saskatchewan *(The Oil and Gas Journal, July 17, page 64).*

Properties acquired in the J. K. Hughes deal included 48 producing wells in Texas, Louisiana, Mississippi, and Arkansas. Thirteen of the wells are in the Texas Gulf Coast, 14 in West Texas (13 of them in Runnels County), 10 in East Texas, 2 in North Texas, 4 in Louisiana, 4 in Mississippi, and 1 in Arkansas.

Also included were royalty interests on about 3,000 acres, most of it in East Texas and Van pools, and about 90,000 acres of undeveloped and wildcat lands in several states.

General American reported monthly income from the properties has been running about $65,000 with about $45,000 of it from producing properties.

Arizona Next?

Shell may be ready to add third oil state this year

FLAGSTAFF, Ariz.—Shell Oil Co. last week was on the verge of giving the United States its thirtieth producing state—the third by Shell this year.

Shell's Arizona wildcat, 2 East Boundary Butte, in Apache County in the extreme northeastern corner of the state last week promised to be an improvement over the company's disappointing 1 Boundary Butte in the same area earlier in the year.

The new well, the best test yet of an Arizona well, recovered gas at the rate of 3,450 M.c.f. daily on a test of the upper Paradox (Pennsylvanian). The well was drilling ahead below 4,670 ft. According to reports from the area the gas has a high liquid-hydrocarbon content. The well is about 8 miles southeast of Utah's Boundary Butte field.

Shell recovered gas and some oil shows in the earlier wildcat from the Hermosa group of which the Paradox is a member. The well gaged 1,200 M.c.f. of gas daily, but later dropped to 600 M.c.f. Gas from this well is being used as fuel in drilling the second.

Number three? . . . If the new well is completed as a commercial producer, Arizona will join South Dakota and Nevada as the nation's newest producing states. Shell completed its 1-A State in South Dakota in March. It is 30 miles southeast of production at Montana's Little Beaver field.

The company completed 1 Eagle Springs southwest of Ely in June to make Nevada the country's twenty-ninth oil producing state. The second well was abandoned early this month and location for a third was staked, 9 miles southwest of the discovery *(The Oil and Gas Journal, August 23, page 106).*

Dakota Boom Over

Beehive of activity gives way to normalcy as state's oil industry settles down for the long pull, slow development

Henry D. Ralph

BISMARCK, N. D.—North Dakota's oil industry enters a period of settled production, slow development, and long-pull payout this fall when the 30,000 bbl. refinery of Standard Oil Co (Ind.) at Mandan goes on stream.

But the big celebration dedicating this plant October 2 won't hide the pessimism of many North Dakotans—particularly merchants, real estate agents, and tavern operators—over the future of the oil business in this region.

Most of the oil companies which came in here to stay still have faith in the Williston basin and are digging in for a long pull, though they intend to evaluate their leased acreage as economically as possible.

Bloom fades . . . The dearth of significant oil discoveries in the state during the past year has very obviously taken the bloom off the boom. North Dakotans are now realizing that the Williston basin is not one vast, continuous lake of oil but that productive spots are scattered and hard to find. It may be just as hard to find a ready market for oil that is discovered.

Leasing and trading in royalties is at a routine level and there are no more premium bonuses for leases and fancy prices for mineral rights. The in-and-out land men and lease brokers have left the state for more active plays. There is a big decline in the number of geophysical crews in the field. And the dry-hole record has written off the hopes of many small towns of becoming a second Tulsa or Houston.

A few operators have farmed out their leases to others and withdrawn from active work in the state, but most of them are engaged in seriously but cautiously evaluating their acreage before their leases expire—generally 5 to 7 years from now.

They reason this way:

Somewhere in the Williston basin oil has been found in every potential reservoir of the stratigraphic column and it is almost inconceivable that there aren't other accumulations of oil in so vast a sedimentary basin. The problem is to find good oil traps.

In the deep central portion of the basin, oil shows are frequently found in tight formations with permeability too low for commercial production, while on the shallower "east side" the same formations have fine permeability but yield only salt water. Also on the east

CONSTRUCTION is nearing completion and testing has started at the 30,000-bbl. refinery of Standard Oil Co. (Ind.) at Mandan, N. D. Dedication ceremonies and a public open house will be held October 2 whether or not the plant is on stream by that date.

side there are few if any seismic structures and wildcatters are more or less blindly probing for stratigraphic traps. The structures in the center of the basin are so overlain with lignite and glacial drift that interpretation of a seismic shooting picture is extremely difficult.

So far this year there have been only three fields discovered, two on the Nesson anticline near Tioga and one off the anticline to the south but small and yielding heavy black oil. There have been 63 dry wildcats drilled this year.

At mid-August there were 13 wildcats and 24 field wells drilling in North Dakota, and 112 oil wells completed—all but 3 of them field wells. The state has a total of 370 producible oil wells, but only about 340 of them have been producing during the summer, with a total output of about 15,000 bbl. per day.

Refining capacity . . . Production should be just about doubled this fall when Standard's Mandan refinery gets into full operation. Heretofore the only market for crude has been by tank car to out-of-state refineries plus the consumption of two small refineries in Dickinson and Williston which opened this year.

Thus the market demand for North Dakota crude will probably be in the neighborhood of 35,000 bbl. per day for some time to come, though the state undoubtedly could produce more than that now and field development is continuing. The crude line of Service Pipe Line Co. connecting the Nesson anticline fields with the Mandan refinery could handle more oil than that, but no additional facilities to provide an outlet for the state's crude are being planned at this time.

The three North Dakota refineries will produce roughly half the petroleum products currently consumed in that marketing area, and the remainder of the market is adequately served by other sources. The Mandan refinery is served by a products pipeline to Fargo on the Minnesota boundary where it connects with Indiana Standard's products system running northwest from Whiting, Ind. At Fargo it also meets the recently enlarged products line of Great Lakes Pipe Line Co. A products line now under construction from Billings refineries to eastern Montana is projected to be extended into north central North Dakota.

The natural gasoline plant of Signal Oil & Gas Co. at Tioga is scheduled to go on stream during September, utilizing most of the gas now being flared in Tioga and Beaver Lodge fields. At the expected rate of oil production, this plant will handle about 40,000,000 cu. ft. of gas daily, though it is designed for 65,000,000. The natural gasoline will be batched through the crude line to the Mandan refinery, and the plant will also produce butane, propane, and sulfur. At present there is no outlet for the residue gas, although two companies are bidding for a permit to construct a gas line to eastern North Dakota.

Now where? . . . When all these facilities are in operation, North Dakota will have a small, integrated, local oil industry, but without hope for much expansion in the immediate future. Additional market outlets probably must await both an increase in the over-all demand for petroleum in the Great Lakes-Mid-Continent region and the development of sufficient new crude-producing capacity to justify construction of a big-inch pipeline to a refining center.

One bright spot is the recent completion of a flowing well in Bottineau County in the north central part of the state, right against the Manitoba line. This county has the only North Dakota production on the east side of the Williston basin but its other wells are all small pumpers producing considerable water. The success of the new well may be due to better completion methods, but it has given new hope to wildcatters in that area, particularly when viewed against several recent Williston basin discoveries not far away in Manitoba.

Gas-Line Rehearing Won

BISMARCK. — North Dakota Natural Gas Transmission Co. has won a rehearing on its application to build a 474-mile, natural-gas pipeline from Tioga to Fargo.

In a surprise move, the Public Service Commission July 21 recalled a conditional permit issued North Dakota Natural to build the 24-in. line. The revocation was based on the company's failure to meet conditions of the permit *(The Oil and Gas Journal, July 26, page 143)*.

The rehearing is scheduled September 14, which is 3 weeks before the commission will hear Northern Natural Gas Co.'s bid to build a similar line.

Western Contracts Awarded

TULSA.—Service Pipe Line Co., acting for its subsidiary Western Pipe Line Co., has awarded contracts to O. R. Burden Construction Co., Tulsa, and H. B. Zachry Co., San Antonio for the recently announced 630-mile, 20, 22, and 24-in. common carrier crude oil line between Fort Laramie, Wyo., and Freeman, Mo.

Burden will build the eastern section of the line and Zachry will construct the western portion. Construction is expected to get under way by September 20 and the company hopes to have the line completed by December 1.

Initial capacity of the line into Freeman will be 160,000 bbl. a day *(The Oil and Gas Journal, August 23, page 107)*.

Strikes Indicated

Pair of Denver-Julesburg basin tests encouraging

DENVER.—Two strikes have been indicated in Adams and Washington counties in areas of the Denver-Julesburg basin where little previous exploratory work has been done.

Ryan Oil Co. has an apparent "J" sand (Cretaceous) discovery 12 miles southwest of Colorado's big Adena field along the general trend of production in Denver-Julesburg. Approximately 18 miles to the southeast in Washington County, New Drilling Co. has an indicated strike in "D" sand.

Ryan's 1 Doss flowed oil at the estimated rate of 40 to 60 bbl. per hour on a drill-stem test at 6,253-61 ft. A core pulled from 6,261-6,301 ft. recovered 3 ft. of sand with excellent porosity and permeability and a stain at the top, followed by 3 ft. of shale. The remainder of the core revealed tight sand with scattered oil stain.

The wildcat is directly north of gas production at Leader field and west of Little Beaver-Badger Creek producing area.

New Drilling 1 Blomenkamp, C NE NE 17-3s-56w, about 3½ miles southeast of Badger Creek, recovered 3,180 ft. of oil on drill-stem test at 5,003-08 ft.

Safety Clinic Set

New drillers' association will be active this fall

LOS ANGELES.—A new trade organization, California Drilling Contractors Association, has scheduled a driller safety education training program for this fall as its first program to serve the interests of contract drilling firms in California.

The organization, an outgrowth of the Contractors Statistical Committee formed in 1951 to do statistical research for drilling firms, will expand its services to include economic research, safety, industry and public relations, insurance and tax surveys, and technological development projects.

The type of safety training to be offered by the association will be new to California drilling contractors and will supplement safety clinics now offered by American Association of Oilwell Drilling Contractors, Western Oil and Gas Association, and American Petroleum Institute.

J. D. Robinson of Santa Fe Drilling Co. has been elected president of the organization. Other officers include: C. L. Fowler, Fowler Drilling Co.; Gene Graham, Thomas P. Pike Drilling Co.; A. S. Hayes, Hayes & Sprague, Inc., and W. F. Patton, Miller & York, vice presidents; E. R. Love, A. D. Rushing, Inc., secretary-treasurer, and Richard Fenton, executive vice president. Patton will serve as chairman of the San Joaquin Valley executive committee and Fowler will hold this post in the Los Angeles Basin committee.

Cities Approve Drilling

LOS ANGELES.—Atlantic Oil Co. has signed a leasing contract with the Harbor Commission to drill on 71 acres immediately west of good production in the Long Beach field in one of three developments in the area involving city approval.

In Wilmington, the City Recreation and Park Commission approved Fowler Drilling & Producing Co.'s bid to drill a slant well under Banning Park.

Merchants Petroleum Co. of Los Angeles announced it plans to drill in the southwest section of Alhambra if the Alhambra city commission will approve the proposal.

The Atlantic lease is for 20 years, with stipulations that Los Angeles receive from 30 to 50 per cent of the oil recovered.

Plant Sets Safety Record

LOS ANGELES.—Shell Oil Co.'s Dominguez natural gasoline plant, which recently was shut down, had operated 29 years, 11 months, and 6 days without a single lost-time accident.

It is estimated that employes had worked approximately 1,500,000 manhours during the nearly 30 years the plant was in continuous operation without losing time on the job due to industrial injury.

The plant processed approximately 55 billion cu. ft. of wet gas and produced more than 140 million gal. of natural gasoline before gas supplies decreased to the point it was uneconomical to continue operations.

One Pump Does Work of Six

BAKERSFIELD. — Drilling & Production Co. is making one pump do the work of six at its properties in the Tejon field 25 miles south of here. The company saved approximately $15,000 the day the operation started.

The company mounted a conventional electric-motor-driven pumping unit on wheels and replaced six stationary units by moving it from well to well. The initial $15,000 saving resulted from salvaging five pumping units.

Because of characteristics of the six 2,600-ft. wells, there has been no loss in oil production by use of the portable pump. Daily output of the wells averages about 5 bbl. whether they are pumped off daily or weekly.

Driven head first onto the well site, the unit requires little time to center the horse-head over the well. The driver's seat nests among the samson-post members so the operator can easily position the unit. A steel base, bolted to the concrete mat provided at each well, serves as a guide in aligning the pump and absorbs the entire pumping load when the unit is in operation.

Average time required for disconnecting from one well, moving to a new site, and connecting onto the new well is about 20 minutes. Two tiedown clamps hold the unit steady while it is in operation.

The portable unit consists essentially of a 40-hp. Ford tractor, standard pumping unit, and steering gear. A 10-hp. electric motor drives the unit through a conventional compound. J. E. Armstrong, manager of Drilling & Production, designed the unit while Hampton Lee, Hopper Machine Works, carried out the detailed engineering work.

Through regulating pumping periods to the wells' productivity, additional savings in power costs and reduced wear and tear are also being realized.

Big Tender Launched

New craft will be put into service off Louisiana coast; four-company group plans tidal test in 97 ft. of water

ORANGE, Tex.—A $1,500,000 drilling tender, largest and heaviest nonself-propelled ship of its type ever built, was launched here last week and will go into immediate service in the West Delta area off the Louisiana coast.

The first such vessel ever constructed in Texas, the craft is the first of two which will be used for tidelands drilling in the Gulf of Mexico by the CATC Group (Continental Oil Co., Atlantic Refining Co., Tide Water Associated Oil Co., and Cities Service Oil Co.).

Big platform, too . . . The group also disclosed that one of the largest drilling platforms ever erected is being rushed to completion in a New Orleans yard and will be placed on location off Grand Isle, Louisiana, in 97 ft. of water. This would be a new water depth record for offshore drilling.

Now under construction at the J. Ray McDermott & Co., Inc., yards in New Orleans, the platform will include living quarters for 30 men, a helicopter-landing space, and storage facilities for all necessary drilling equipment.

Tender . . . The new tender is 260 ft. long and 54 ft. wide and weighs 2,905 tons. Built at the Levingston Shipyards here, it was chistened the "J. C. Craig," a name borrowed from the production superintendent of Conoco's marine division. Continental engineers helped design the craft.

Air-conditioned quarters for a 48-man crew are provided in the ship, along with modern recreational facilities. The ship also has storage facilities for 2,400 bbl. of drilling mud, more than 13,000 bbl. of drilling water, 825 bbl. of fuel oil, 4,200 sacks of dry bulk mud, and 2,200 sacks of bulk cement.

The J. C. Craig is fitted with a 70-ft. boom crane which will be used to transfer pipe onto the drilling platform and to unload other heavy equipment from supply boats to the tender. A sister ship is to be delivered in mid-November.

Platform features . . . Deck of the platform will stand 50 ft. above the water. The structure will be the first platform of its type to feature cross-bracing completely above the water line, thus reducing corrosion in the tidal zone.

Measuring 220 by 106 ft., the platform will be supported by 24 30-in. piles. Like the tender just completed, it will cost approximately $1,500,000.

CATC record . . . Organized in July 1946, the CATC Group spent 3 years doing extensive seismograph work off the coast of Louisiana. It spudded its first well in March 1952 in West Bay, about 5 miles off Plaquemines Parish, resulting in discovery of West Delta field.

The group's percentage of successful wells has been exceptional. Of 15 wells completed, 11 have found oil or gas.

The group is producing about 1,500 to 2,000 bbl. of oil daily under current allowables from eight wells. In addition, it has three shut-in gas wells, two in West Delta and one in the newly discovered West Cameron Block 192 field, 30 miles from shore. An offset is currently being drilled.

Four more wells, including three development wells in the West Delta area and a wildcat in East Cameron Block off Cameron Parish, also are being drilled.

CATC Group has about 9,500 producing acres off Louisiana and 285,000 undeveloped acres. It also holds 29,000 undeveloped acres off Texas.

Offshore possibilities seen for . . .

. . . Skid-Mounted Sulfur Plant

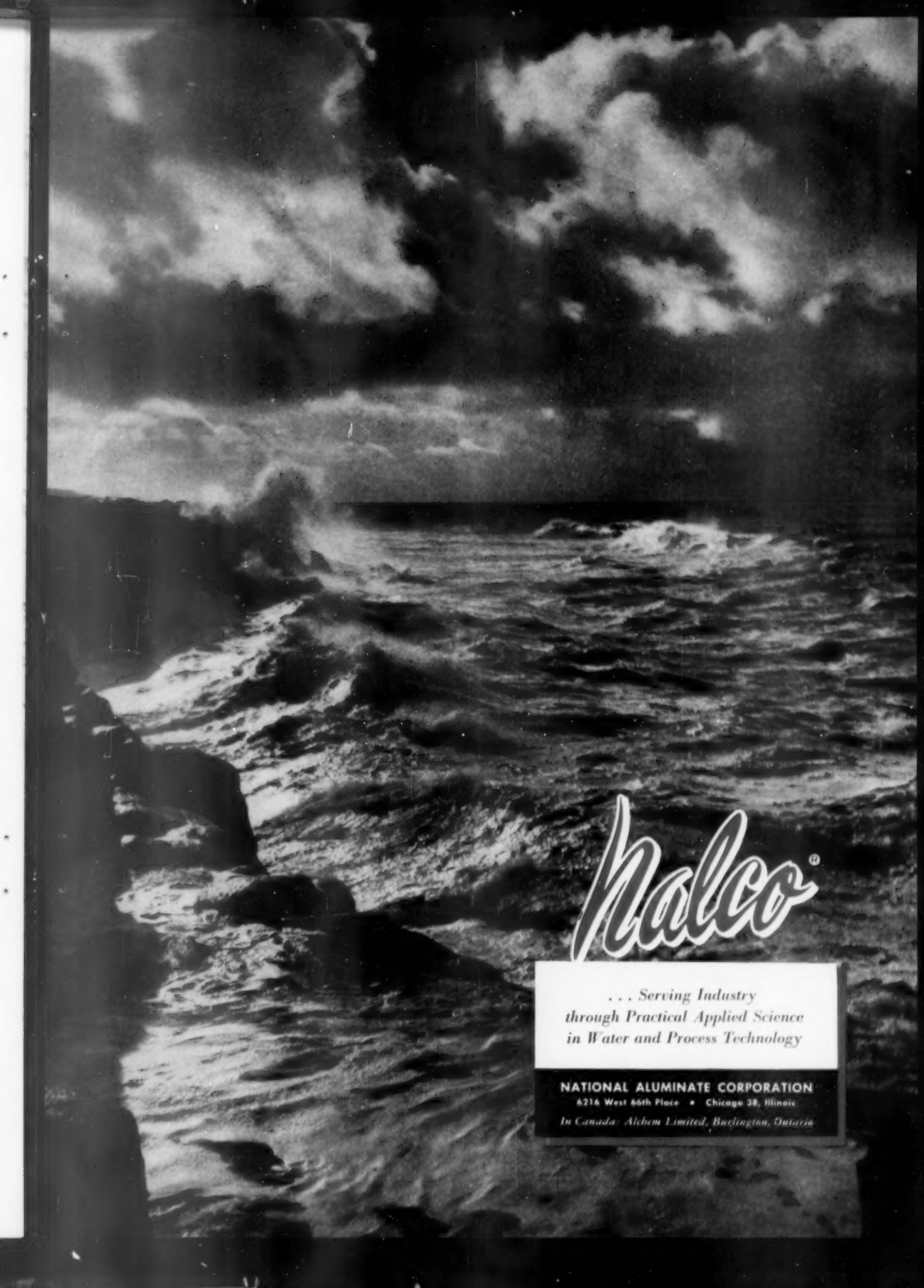
HOUSTON.—A "portable" sulfur plant has been developed which can be mounted on an offshore platform.

Designed to permit development of sulfur deposits previously considered too small for commercial production, the new unit may be the answer to oil-company problems if and when the offshore oil firms get serious about producing sulfur.

Humble Oil & Refining Co. already is engaged in drilling 20 exploratory tests to determine sulfur possibilities in Grand Isle Blocks 16 and 18 off the Louisiana coast. In view of salt-dome sulfur production along the Gulf, it may well be that several oil companies will be in the offshore sulfur business before many years pass.

The new-type plant, designed by the H. E. Bovay, Jr., consulting firm, uses a modified Frasch process. It differs from established design in its use of direct-fired heaters, which simplifies plant operation. With modern instrumentation, the plant can be operated with only four men each watch.

One of the new plants has been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operating for Standard Sulphur Co. on Damon Mound, near Rosenberg, Tex., for 8 months. The entire plant, including water-treating plant, power plant, relay station, and molten-sulfur pan, is a semioutdoor skid-mounted unit.

The complete plant, except for foundations, can be dismantled and moved to a new location on land in about 30 days and for less than $50,000. On land, such a move would leave foundations valued at about $35,000, plus fuel-supply lines and water-supply facilities. Offshore installations, it is expected, could be completely salvaged.

Gulf Tests Planned

Five-well unit assembled by Magnolia on big lease

HOUSTON. — Magnolia Petroleum Co. has completed fabrication and started assembling on location a big five-well platform from which it will drill the first test on its high-priced 11,520-acre lease 8 miles off the coast of Jefferson County, Texas.

Magnolia expects to spud in about the middle of September. The scheduled 13,000-ft. wildcat will be located in the western portion of Tract 10.

The company paid Texas more than $4,500,000 for a lease on Tract 10 and adjoining Tract 9, each totaling 5,760 acres, at the big lease sale last December.

In 35-ft. water . . . The template-type platform will be located in about 35 ft. of water. It will be supported by 22-in. pilings and will stretch almost 400 ft. from end to end. Its deck will be about 35 ft. above the water level.

The main platform, which will accommodate drill pipe, casing, and all other auxiliaries, as well as the rig, is 256 ft. by 53 ft. Living quarters for the crew will be on a separate 55 by 46-ft. platform, connected to the main structure by an 88-ft. catwalk.

Nearest production to the drill site is at Clam Lake field to the northwest and about 2 miles inland in Jefferson County.

If the wildcat proves successful, the rig will be skidded to each of the four remaining locations, which are about 7 ft. apart on a line. Skidding can be handled as a one-shot operation since derrick, engines, draw works, etc., are on a unitized substructure.

Land base established . . . An onshore base for the operation has been set up at Sabine Pass, Tex., about 14 miles northeast of the well location. A marine base and fabrication yard as well as a central operations office have been located there.

The yard installation will also serve as a storage site for pipe and other equipment and as a base for work boats servicing the drilling operation. Transportation to the drill site will be by crew boat, supplemented with helicopter service for supervisory personnel. Installation of a 60-ft. radio antenna has been completed for sea-to-shore communication.

Team Plans Offshore Test

HOUSTON.—Seven companies have teamed up to wildcat on a 10,240-acre tract off Matagorda Island.

Western Natural Gas Co., El Paso Natural Gas Co., and Texoma Production Co. have entered into an agreement with Superior Oil Co. Aluminum Co. of America, Stanolind Oil & Gas Co., and Tidelands Oil Corp. to drill the block of small leases, which lies about 3½ miles off the island.

The Western Natural group is acquiring a half interest in the tract in return for drilling a 12,500-ft. test. Drilling is to begin in mid-October.

New Six-Well Rig Ordered

NEW ORLEANS.—The California Co. has ordered its second offshore rig designed to drill up to six wells without being moved.

Like the first rig, which went into operation at Main Pass Block 69 field off the coast of Louisiana, the new one will be used in the Louisiana tidelands. Platform and substructure of the second unit will be built by Avondale Marine Ways, Inc., which did similar work on the first multiple-hole rig.

Calco's experimental rig, first tested last winter, permits the crown block and rotary table to be moved to six different positions. *(The Oil and Gas Journal, January 18, page 82).*

Platforms vs. Barges . . .

. . . Hurricane Casts a Vote

HOUSTON. — Will platforms or barges dominate the offshore drilling picture in the future?

This is a question continually being debated along the Gulf Coast, and the most recent fuel to the fire was added in favor of the platforms by the hurricane "Barbara."

Two big barges off Louisiana were bounced around by this latest big blow, and reports are that one was pushed 8 ft. off its location.

Proponents of the platforms point to their ability to withstand any of the elements which threaten water operations. The tender ship, they say, always can be moved into protected waters.

Advocates of the drilling barges point to their ability to move quickly from one location to another and to the economy of cutting tear-down and rig-up time. They perform very well, they say, even under difficult conditions.

At present there are only a few of the novel new barges, but their number is increasing. Several now are under construction, some of the same general design as most of those afloat, but some of them radically new.

Operators readily agree on the need for a highly mobile drilling unit which would eliminate the need for a man-made island in the water, but many wonder if the barge is the answer. Actually, they say, it is still too early to make a fair comparison between platforms and barges.

The recent big hurricane isn't expected to cancel any barge designs now on the drawing boards. The barge advocates are confident of the success of the mobile equipment, and they insist the advantages of the barge will far outweigh the minor operating difficulties which their mobility creates.

It is certain, too, however, that "Barbara" will have a big influence in the design of future units.

PLATFORM . . . Still tops offshore.

French Offset Completed

Esso Standard's second Parentis producer flows 1,960 bbl. daily through ½-in. choke; field may be Europe's largest

ESSO STANDARD, S.A.F., has brought in a second producer in the major French field discovery it made earlier this year at Parentis 44 miles southwest of Bordeaux.

The No. 3 well drilled 1,200 m. (3,940 ft.) west of the discovery and on the south side of the lake produced approximately 13 cu. m. per hour (1,960 bbl. daily) on a ½-in. choke. The test was made at 2,366 m. (7,750 ft.).

The well was reported to have been drilled to 2,449 m. (8,040 ft.) and plugged back to 2,400 m. (7,880 ft.) The results indicated an oil column of 340 m., or around 1,100 ft.

The No. 2 well, drilled 1,200 m. southwest of the discovery, ran considerably lower, meeting the limestone at 2,591 m. The company has another test under way on the north side of the lake 1,200 m. north of the discovery.

Potential . . . Drilling at Parentis points to the discovery of what may rank by far as Europe's largest oil reserve. The Esso discovery came last March in the second wildcat drilled on a concession of about 4,000,000 acres in southwestern France *(The Oil and Gas Journal, April 26, page 129).*

France's oil law has been amended to allow the Esso organization to produce the Parentis area in advance of the formal grant of an exploitation concession. Previous, 20 months had to elapse between the discovery and the exploitation. The minister of mines is now authorized to permit production before the exploitation concession is granted, with terms of the exploitation taking effect retroactively.

Another French exploration development of possible importance has been reported in the well drilled by the French Government-owned company, Regie Autonome des Petroles, on the Bray anticline near the city of Beauvais 40 miles north of Paris. The well was drilled to basement rock and plugged back into the Jurassic limestone where clean oil was recovered after acidization.

Digboi Field Passes 50 Million Barrels

General workshops and stores (foreground) of Assam Oil Co., Ltd., keep things going in Digboi field, one of the world's oldest and for many years India's only field. Digboi early this year produced its 50,000,000th bbl. of oil since it was discovered in 1890. Present producing rate is more than 6,000 bbl. daily from roughly 650 wells. The field flows and pumps 36°-gravity crude from the Mio sand at 3,000 ft. Development drilling of recently discovered sands is still being carried on at the eastern end of the field.

Spanish Test Begun

American group undertakes wildcat in northern sector

AN United States group headed by General American Oil Co. of Dallas, Tex., has undertaken a second wildcat in northern Spain.

The well, Castilfrio, is situated on the Oncala anticline, a surface structure, about 15 miles northeast of Soria in the province of the same name. The location is about 75 miles southwest of the first unsuccessful well north of Tudela which was abandoned about a year ago at 11,205 ft.

The heavy rig being used in the operation is the same that drilled the first well. It was originally imported into the country by Delta Drilling Co., which has an interest in the venture. This equipment was purchased by the Spanish Government corporation, Instituto Nacional de Industria, and made available to the group for use by Delta in drilling the Castilfrio well.

Further north in the Pyrenees, the Spanish exploratory company, Cia. de Investigacion y Explotaciones Petroliferas, S. A. or CIEPSA (a subsidiary of Cia. Espanola de Petroleos, S. A.) is reported continuing making slow progress in drilling a test on a surface anticline near Boltana. The German firm, C. Dielmann Bergbau, is assisting with the operation.

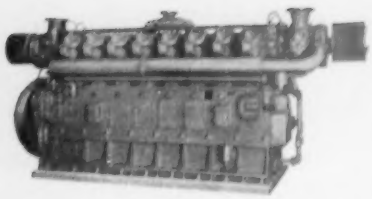
Israeli Wildcat Staked

Pontiac Petroleums, Ltd., plans to get under way within the next month or 6 weeks on its first Israeli wildcat at a location about 20 miles north of Tel Aviv.

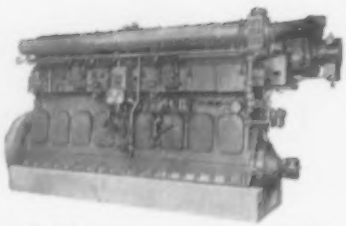
A U-15 rig and auxiliary equipment arrived in Haifa last week. Konrad Stzycgold, who is managing the Israeli operations, left New York recently with a party of drilling crew members from Texas.

Pontiac, which has a contract to explore on a 50 per cent participation basis the 880,000 acres held by Israel Continental Oil Co., a Canadian firm, plans its second test on the Caesarea anticline 3 miles to the southwest of the first well location. For this second well, heavier equipment probably will be brought in to take the well deeper than the 9,000 ft. planned for the initial test near the village of Zichron.

The company is committed to a program of at least eight wells.

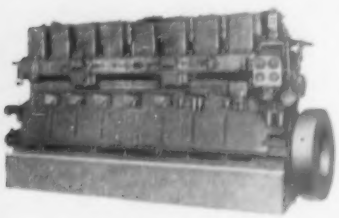


TYPE FVA ..... 8, 12 or 16 cyl.
Diesel — Atmospheric ..... 430 to 1150 hp.
Diesel — Supercharged ..... 1110 to 2230 hp.



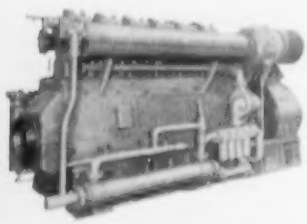
TYPE LS ..... 6, 7 or 8 cyl.
Atmospheric and Supercharged
Gas ..... 720 to 2500 hp.
Diesel ..... 825 to 2500 hp.
Gas-Diesel ..... 825 to 2500 hp.

TYPE LSV ..... 12 or 16 cyl.
Atmospheric and Supercharged
Gas ..... 1440 to 5000 hp.
Diesel ..... 1650 to 5000 hp.
Gas-Diesel ..... 1650 to 5000 hp.



TYPE JS ..... 5, 6, 7 or 8 cyl.
Atmospheric and Supercharged
Gas ..... 375 to 1615 hp.
Diesel ..... 450 to 1815 hp.
Gas-Diesel ..... 450 to 1815 hp.

TYPE GS ..... 5, 6 or 8 cyl.
Atmospheric and Supercharged
Gas ..... 325 to 1480 hp.
Diesel ..... 300 to 1480 hp.
Gas-Diesel ..... 300 to 1480 hp.



TYPE EW ..... 6 cyl.
Diesel — Atmospheric ..... 245 to 500 hp.
Diesel — Supercharged ..... 350 to 835 hp.

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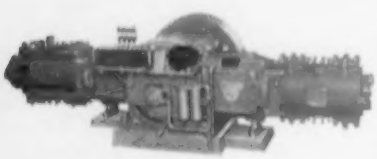


TYPE EM
To 350 hp.
9" stroke
Speed to 514 RPM

TYPE FM
To 1500 hp.
10½" stroke
Speed to 514 RPM

TYPE JM
500 to 3000 hp.
14" stroke
Speed to 327 RPM

Cuban Play Spreads

New exploratory ventures on island concessions launched by Canadian company and Ted Jones, West Coast operator

TWO more exploratory ventures have been launched by independent interests in the current Cuban oil play touched off by the Jatibonico discovery last May.

A Canadian firm, American Le Duc Petroleum Co., Edmonton, Alta., announced in New York that a wholly owned subsidiary, Cuban-Canadian Petroleum Co., Ltd., has signed an agreement for work on nearly five million acres in Cuba.

Earlier, in Los Angeles, Ted Jones, a West Coast oil operator, disclosed plans to undertake operations soon on a block of concessions obtained from the Cuban Government.

The rush to Cuba started early this summer after a group of Cuban investors represented by Dr. Antonio Iglesias and assisted by Kerr-McGee Oil Industries, Inc., brought in the Echevarria wildcat about 3 miles northwest of Jatibonico *(The Oil and Gas Journal, May 10, page 90)*. Companies which have had no luck in Cuba in intermittent exploration for the last 50 years began re-examining geological reports, while others moved in to negotiate favorably situated acreage.

Canadian venture . . . Lowell M. Birrell, president of American Le Duc Petroleum, said an agreement had been signed with two Cubans, M. A. Nogueras and Rene Pelleya Justiz under which exploration rights were obtained on 4,922,700 acres extending through five provinces, Matanzas, Havana, Las Villas, Pinar De Rio, and Camaguey. He said drilling would begin within 90 days.

Birrell said the company would apply for a government loan to take advantage of a recent offer made to stimulate oil exploration. Under this policy, operators investing a million dollars can obtain a government loan for two-thirds that amount at 6 per cent interest. If oil is found, the operator must pay a bonus of 10 per cent on the loan plus additional royalty ranging from 2½ to 25 per cent above the regular 10 per cent. If the operation is unsuccessful, the government loses its money.

Jones, who is head of Ted Jones Drilling Co. and who is interested in a string of West Coast theatres, said he had formed the Jones Oil Enterprises of Cuba to handle the operation. His concessions from the government include shore, tidal, and submerged lands, extending about 28 miles eastward along the coast from a point within 4 miles of Havana Harbor. Jones disclosed he had set aside $400,000 for the venture. A rig and other equipment is slated to be shipped from San Pedro early in September.

Others . . . Some 16 new companies have been established in Cuba in recent months and are preparing to begin exploration. Money from Oklahoma, Texas, and California, as well as Cuba, is backing these ventures. Areas of particular interest include the Jatibonico and Cauto basins of Oriente Province and the Cienega de Zapata section on the southern coast of Matanzas and Las Villas provinces. Companies participating in the Cuban exploration include American Oil Co. (partly owned by the Grady Vaughn-Herbert W. Klein interests in Dallas), and Deep Rock Oil Corp. and Sterling Oil Co., both of Tulsa *(The Oil and Gas Journal, August 9, page 83)*.

Recently besides making its offer of loans with no repayment in case of failure, the government reduced surface taxes on exploration concessions to the equivalent of about 2 cents an acre and provided for exemption from the 10 per cent profits tax, as well as the tax on capital stock issues and other levies, to companies spending a million dollars or more on exploration provided they start drilling immediately and continue without interruption. The period for converting concession applications to titles was cut to 330 days in another move to speed exploration.

The Echevarria well earlier in the summer was producing a heavy emulsion of 14-15°-gravity which was flowing through a ½-in. choke at the rate of 100-120 bbl. daily. More recent reports said the well was producing only a few barrels daily because of the water content and the lack of storage space. The main significance of the discovery appeared to be from the geological standpoint in that it was the first in Cuba to produce from nonserpentine, sedimentary rock and in the southern part of the island.

Characteristics of Echevarria Crude

WHOLE CRUDE SAMPLE*

A.P.I. gravity	14.9
Sulfur, per cent	2.007
Visc. S.U. at 122° F., sec.	56
C.C.R.	5.84
I.b.p., °F.	420
5 per cent	478
10 per cent	504
20 per cent	550
30 per cent	640
40 per cent	725
50 per cent	800
59 per cent (cracked)	930

CUT NO. 1—10 PER CENT CRUDE

A.P.I. gravity	29.3
I.b.p., °F.	412
End point	575
Recovery, per cent	98
Sulfur, per cent	0.381
C.C.R.	Nil
Saybolt color	12-15

*Original sample was wet, 10.5 per cent b.s. and w. Sample dehydrated before running tests.

CUT NO. 2—20 PER CENT CRUDE

A.P.I. gravity	24.7
I.b.p., °F.	476
End point	646
Saybolt color	+9
Visc. S.U. at 100° F., sec.	46
C.C.R.	Nil

CUT NO. 3—29 PER CENT CRUDE

(Too heavy for distillation)

A.P.I. gravity	15.9
Color, N.P.A.	1.5
C.C.R.	Nil
Visc. S.U. at 100° F., sec.	287
Pour, °F. (better than)	20

BOTTOMS—41 PER CENT CRUDE

Penetration at 77° F.	168
Penetration at 32° F.	27
Soft. point at 100° F.	100
Oliensis	Neg.
Specific gravity	1.0266
Solubility at 86° B naph., per cent	94.76
Solubility in CCl_4, per cent	99.97

Refinery Adds Avgas Units

Standard-Vacuum Refining Co., Ltd., is adding aviation-gasoline manufacturing facilities to the new 27,000-bbl. daily refinery which it is building at Altona, near Melbourne, Australia.

Construction is to start soon on the facilities which will cost the equivalent of nearly $4,000,000. The aklylation unit, which will use sulfuric acid from Commonwealth Fertilizers & Chemicals, Ltd., will have an annual throughput of 20 million imperial gallons, or about 1,550 bbl. daily.

The new Altona refinery is scheduled to be officially opened next February. It is being built at the site of the company's existing 2,200 bbl. daily lubricating-oil refinery.

New Australian firm plans . . .

. . . Search in Victoria

FORMATION of a new company, Frome-Lakes Pty., Ltd., with important American and British backing has given Australia's exploration program its biggest boost since the Caltex-Ampol group struck oil last November at Rough Range.

The new company will have a nominal capital equivalent to $4,000,000. The company will prospect and drill in an area of 1,400 sq. miles in a narrow strip about 120 miles long and up to 30 miles wide running along the southeast coast of Victoria around the tidal Gippsland Lakes. Several promising structures have been found in this area as a result of seismic surveys conducted by the Federal Bureau of Mineral Resources.

Organization . . . Frome-Lakes Pty. Ltd., was formed by the financially-strong Frome-Broken Hill Pty., Ltd., and two small companies Lakes Oil, Ltd., and Austral Oil Drilling Syndicate N. L., which held the search permits covering the area now taken over by the new company.

The major shareholder, Frome-Broken Hill Pty. Ltd., is owned by D'Arcy Exploration Co., Ltd., a subsidiary of Anglo-Iranian Oil Co., Ltd., Vacuum Oil Co. Pty., Ltd., and Consolidated Zinc Pty., Ltd., one of Australia's wealthiest mining companies.

Chairman of the new company is Sir Norman Mighell, representing Consolidated Zinc Pty., Ltd. General manager is N. B. Sauve who is also general manager of Frome-Broken Hill Pty., Ltd.

Large-scale program . . . The company's operations will be the first large-scale bid to find oil in Victoria although small noncommercial quantities of low grade heavy oil were recovered near Lakes Entrance between 1948 and 1952 by Lakes Oil, Ltd.

Serious interest in the area first arose as a result of gravimetric surveys made for Lakes Oil, Ltd., in 1950 by the Robert H. Ray Corp., Houston, Tex.

In 1951 and 1952 the Federal Bureau of Mineral Resources considerably extended these surveys and gave special attention to the more favorable areas indicated by the work of the Ray organization.

Australia's Bureau of Mineral Resources, Geology and Geophysics is looking for geologists and geophysicists. The bureau is expanding its operations due to the increased oil activity on the continent in recent months. For details of the type of personnel sought **see page 165.**

The Bureau also carried out aerial magnetic surveys over most of the Gippsland basin, sent in geological parties on the ground and then concentrated seismic investigations at three points on the coastline south of the town of Sale.

Thick sediments . . . Sedimentary formations were found to be about 6,000 ft. thick, or twice the thickness elsewhere in the basin, and structures considered to be well worth drilling were revealed.

The new company has high hopes of finding payable oil. It is arranging to bring out several top-level American experts to organize a vigorous program of drilling and further geophysical investigations.

Backed by the technical and financial resources of Vacuum and Anglo-Iranian, the company is in a position to match the intensity of the search being conducted by the Caltex-Ampol interests 2,500 miles away on the extreme western tip of the continent.

Also helping to insure vigorous activity will be the desire of Anglo-Iranian to make up for the fact that it once had the opportunity to acquire the rights to the Rough Range area around Exmouth Gulf but rejected it as unworthy of detailed investigation.

AERIAL MAGNETOMETER surveys of the area to be prospected by the new Australian company were made by crews from Australia's Federal Bureau of Mineral Resources such as this one operating from the cabin of a Dakota aircraft in flight.

Boats to Aid Exploration

Texas Petroleum Co. has taken a fleet of river boats up the entire length of the Amazon River for its exploratory operations in eastern Peru.

The river craft will be used for seismograph work which will be carried out by Geopnysical Service, Inc., beginning in October. The fleet taken to Iquitos in the headwaters of the Amazon includes a 65-ton tug, two double-deck steel houseboats each 120 ft. in length, a 300-ft. steel barge, and a utility boat. Texas Petroleum barges, formerly used in Tucupita field in the Delta Amacuro in Venezuela, were reconditioned in Trinidad for the Peruvian program.

Texas Petroleum holds nearly one million hectares (about 2,500,000 acres) in the Montana of Peru and has embarked on a long-range exploration program in this concession.

Germans Enter Peru

A group of three West German oil companies has arranged for acreage to participate in the exploratory work now under way in the Montana of eastern Peru.

The German group consists of Deutsche Erdoel, A. G., Gewerkschaft Elwerath, and Wintershall, A. G., all leading German operators. They have

Bethlehem X Mayari Sucker Rods have performed satisfactorily at Turner A-7 lease, in the Grayburg-Jackson field, since October, 1947. Well produces 15 bpd of 37-gravity oil, from 3410 ft.

Going After the Crude at Loco Hills

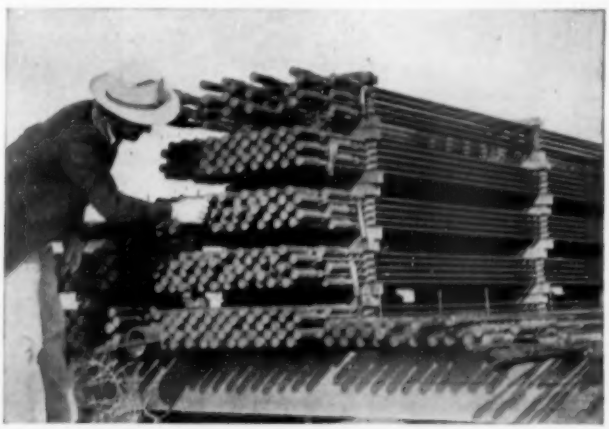
Steady pumping, day after day—that's the rule at the Turner A-7 lease in the Grayburg-Jackson field, Loco Hills, New Mexico. At this Eddy County location, the Southern Production Company, Inc., is pumping 37-gravity oil from San Andres lime, at a depth of 3410 ft.

The well is equipped with a Bethlehem 51D-TE-10 pumping unit. The sucker rod string, made up of Bethlehem X Mayari Rods (nickel-chrome-moly), has been giving satisfactory performance for more than six years.

Many operators in the oil fields are availing themselves of the economy and dependability of Bethlehem Sucker Rods. These rods are made of carbon and alloy steels, and are fully normalized. They come in four types, each designed for a specific kind of pumping duty. For full information, get in touch with the nearest Bethlehem office or sucker rod distributor.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Leonard Vandever, superintendent for Southern Production Company, Inc., checks stuffing box and operation of string. The X Mayari rods are ideal for heavy pumping in corrosive wells.



Bethlehem unit package holds rods securely during shipment and storage, preventing rod damage. Package holds 80 or 100 rods, and can be lifted by a gin-pole truck and lifting rig.

BETHLEHEM *Sucker Rods*

BETHLEHEM STEEL

reached an agreement with the Peruvian company, Cia. Peruana el Oriente, for operations on concessions covering some 500,000 hectares, (about 1,250,000 acres) near the Ganzo Azul area.

Deutsche Erdoel has three refineries in West Germany and is an important producer and distributor. Elwerath operates producing properties in the Hanover and Emsland districts of Germany and holds interests in refining companies. Wintershall controls oil properties and a refinery at Salzbergen and with Elwerath owns the Lingen refinery in Germany.

International Briefs

A $3,500,000 power plant is being built by Mene Grande Oil Co., to provide power for its widely scattered operations in Anzoategui in Eastern Venezuela. Three gas turbines, the first to be installed in Venezuela for power production, will deliver 15,000 kw. The first is to be in operation by the end of this year, and the other two will be completed in 1955.

The Chilean Government company, Empresa Nacional del Petroleo, is planning to undertake exploratory drilling at Salar Pedernales in Atacama Province. A recent geological report to ENAP said there are "outstanding possibilities" in the area and also that there are definite prospects for exploration in Chile's northern desert. ENAP's operations up to now have been in the Tierra del Fuego region in southern Chile.

The last of a series of 10 tankers ordered in West Germany by the Greek shipowner, A. S. Onassis, has been launched at Kiel. The vessel, a turbine-propelled tanker of 21,800 tons loading capacity, is the Olympic Brook, due to be delivered in September.

Deutsche Erdoel, A. G., has made a discovery in its exploratory well, Oerrel-Sued 2 which is located 1.8 miles south of the village of Oerrel in the Hanover Province of West Germany. The well on test flowed oil from a Dogger Beta sandstone at a depth of 4,571-84 ft.

The Belgian company, Cie. Financiere Belge des Petroles (Petrofina), has taken over the Italian refining company, Permolio, and arranged a larger loan in Switzerland for the expansion of Permolio's Rome plant, according to reports from Rome. Petrofina also is reported to be studying a pipeline to carry crude directly from a tanker terminal at Fiumicino to the refinery.

River Barges Move Crude To . . .

. . . Expanded Mantua Refinery

RAPID expansion of the highly competitive Italian refining industry is bringing a big increase in river and pipeline transportation facilities for moving crude oil to inland plants.

Exemplifying the trend toward greater use of waterways is the river system serving the recently enlarged Mantua refinery of Industrie Chimiche Italiane del Petrolio. Crude for the refinery (partly owned by Omnium Francais des Petroles) is transported by two 600-ton barges on the Po and Mincio rivers from Porto Marghera (Venice) where storage has been provided for 25,000 cu. m. (157,000 bbl.).

To insure crude in case of transport difficulties, 90,000 cu. m. (565,000 bbl.) can be stored at the refinery site. The refinery has a processing capacity of 600,000 tons (12,000 bbl. daily).

The Belgian company, Cie. Financiere Belge des Petroles (Petrofina) plans to lay an 18-in. line from the port of Fiumicino on the mouth of the Tiber River to the Rome refinery of Permolio, S.p.A.

Petrofina recently acquired this independent Italian refining company, which also operates plants at Milan and Genoa. Petrofina's program calls for increasing capacity of the Rome refinery to 1,000,000 tons (20,000 bbl. daily) from its present capacity of about 9,000 bbl. daily. At Fiumicino the port is to be made accessible to tankers of up to 30,000-ton dw. size.

Another project calls for an increase in capacity of the Fornovo Taro (Parma) refinery to 700,000 tons (14,000 bbl. daily) and construction of a line to the refinery from Borretto on the Po River. Imported crude for the refinery can be brought up the Po's inland waterway. The 2,200-bbl. daily Fornovo Taro refinery was a part of the Soc. Petrolifera Italiana properties sold by Standard Oil Co. (N.J.) earlier this year to Italian interests.

Other expansion projects will include catalytic cracking units at the Socony-Vacuum refinery at Naples and the Italian State Oil Monopoly plant at Cortemaggiore, in addition to facilities recently completed at Cremona by Raffineria "Italia" S.p.A.

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DRILLING SHOT HOLES for geophysical operations on University Lands prospect in Andrews County, West Texas.

SEISMIC EXPLORATION in shallow Gulf of Mexico. Men are "poling down" a set of geophones. (Courtesy Cities Service).

Texas Poses Tough Geophysical Problems

Here are some of them, area by area, and how geophysicists are solving them

by J. S. Pluta* and Ben F. Rummerfield†

ONE of the major problems confronting the geophysicists today within certain segments of oil provinces in Texas is the ability to record usable seismic reflection data. The use of improved seismic techniques, such as (1) multiple holes, (2) multiple geophones, (3) multiple holes and multiple geophones, (4) long in-line offsets, (5) right-angle offsets (broadsides), (6) surface shooting, and (7) variable seismic playback units, has helped to solve these difficult areas. Heretofore it was impossible to evaluate prospects in these areas with the reflection seismograph. It does not follow, however, that a seismic party can move into an area which is considered to be one of "NG" results, and with the application of one of the above-mentioned techniques, obtain recordings of usable quality. The use of one of the above techniques will tend to give the geophysicist more latitude in solving the particular problem at hand.

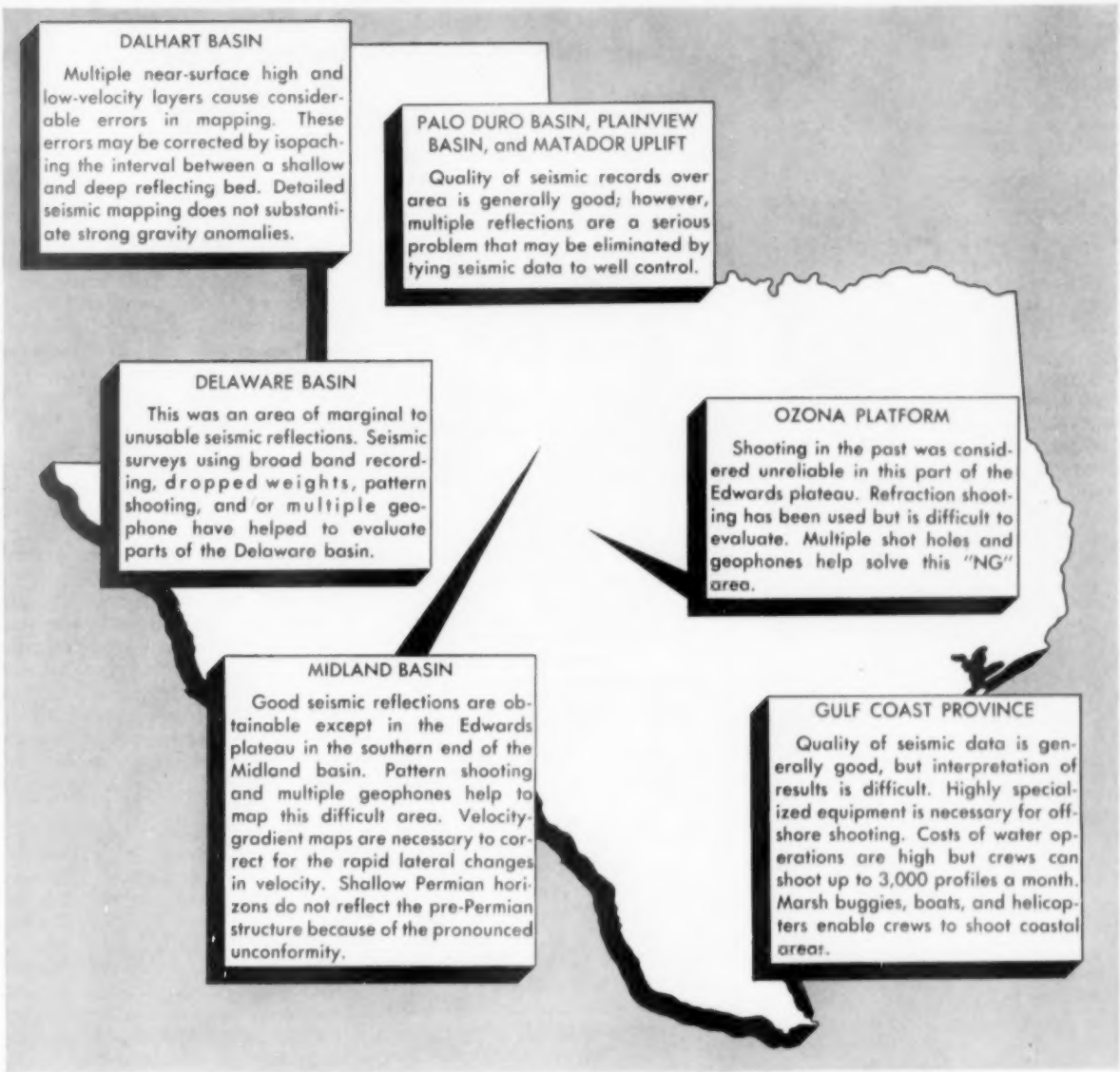
*Honolulu Oil Corp., Midland, Tex., and †Century Geophysical Corp., Tulsa.

In many areas in West Texas, a suitable technique may be found applicable for obtaining usable recordings, only to move ½ mile away and obtain questionable results. At times the path of least resistance is taken and surface conditions are blamed for the changing or record quality. Further examination often reveals this is merely one of the problems. Other, and often more serious problems exist. An attempt will be made to discuss some of the most outstanding problems confronting the geophysicist in Texas by examining some specific areas.

Dalhart Basin

Portions of the Dalhart basin present major geophysical problems. Along the breaks of the Canadian River and its tributaries there are areas of notoriously poor seismic recordings. Immediately away from the breaks the recordings improve from nonusable to usable data; however, variable near-surface velocity conditions present a problem. A system of deep holes in this area establishes the fact that multiple high and low-velocity layers exist down to depths of approximately 800 ft. If this condition is not recognized, erroneous seismic maps result. Isochronouspachous control between a shallow and deep reflector helps in eliminating the effect of the variable near-surface velocity condition.

It is interesting to note that detailed gravity surveys, and their second derivative equivalents, map beautiful gravity anomalies in the Dalhart basin. Several of these gravity anomalies have been checked by a detailed seismograph reflection program and the gravity anomaly was not substantiated. Since gravity data are based on a differential density reading from station to station, the near-surface conditions which are responsible for the variable velocity layers probably influence the gravity data. An attempt may be made to remove as much of the near-surface conditions as possible in order properly to evaluate the gravity maps, but this is extremely difficult.


DALHART BASIN
Multiple near-surface high and low-velocity layers cause considerable errors in mapping. These errors may be corrected by isopaching the interval between a shallow and deep reflecting bed. Detailed seismic mapping does not substantiate strong gravity anomalies.
PALO DURO BASIN, PLAINVIEW BASIN, and MATADOR UPLIFT
Quality of seismic records over area is generally good; however, multiple reflections are a serious problem that may be eliminated by tying seismic data to well control.
DELAWARE BASIN
This was an area of marginal to unusable seismic reflections. Seismic surveys using broad band recording, dropped weights, pattern shooting, and or multiple geophone have helped to evaluate parts of the Delaware basin.
OZONA PLATFORM
Shooting in the past was considered unreliable in this part of the Edwards plateau. Refraction shooting has been used but is difficult to evaluate. Multiple shot holes and geophones help solve this "NG" area.
MIDLAND BASIN
Good seismic reflections are obtainable except in the Edwards plateau in the southern end of the Midland basin. Pattern shooting and multiple geophones help to map this difficult area. Velocity-gradient maps are necessary to correct for the rapid lateral changes in velocity. Shallow Permian horizons do not reflect the pre-Permian structure because of the pronounced unconformity.
GULF COAST PROVINCE
Quality of seismic data is generally good, but interpretation of results is difficult. Highly specialized equipment is necessary for offshore shooting. Costs of water operations are high but crews can shoot up to 3,000 profiles a month. Marsh buggies, boats, and helicopters enable crews to shoot coastal areas.

Advanced techniques have enabled geophysicists to obtain usable seismic data in many areas in Texas. End result will be more new oil fields.

Magnetics in the Dalhart basin probably portray the basement complex of the basin.

Palo Duro Basin, Plainview Basin, and Matador Uplift

The greater portion of the Palo Duro basin, Plainview basin, and Matador uplift is covered with Tertiary formations and it is an area of good reflection return.

Generally, the seismic records obtained are easy to pick; however, the problem of multiple reflections exists in parts of these areas. Geological and geophysical data must be coordinated closely in order to evaluate the cause of identifiable multiple reflections. All seismic data should be tied into the existing wells in order to eliminate the possibility of using erroneous multiple data for mapping purposes. Velocity profiles help to identify the various reflections but will not separate the true reflection from the multiple.

In regions where the reflecting interfaces have large dips it is difficult to interpret the reflection data if offset spreads are used. Although the theory of seismic paths is rather well established, errors exist in migrating dips due to the lack of knowledge concerning velocity distributions. Use of straight-line functions based on an average vertical velocity may introduce errors of appreciable magnitude in areas of steep dips.

Midland Basin

Much of the Midland basin is covered by a Tertiary mantle and is considered an area of good seismic reflection return. The southern extension of the Midland basin onto the Edwards Plateau has an inherent problem of recording usable energy for reliable mapping purposes. With the application of one or more of the earlier mentioned geophysical techniques, usable records are obtained in the Edwards Plateau. Weathering problems are prevalent in many areas confronting the geophysicist; however, these problems can be solved by means of one of the several methods available in the literature. A system of deep holes helps to resolve any near-surface variable weathering problem.

Fortunately, within the Midland basin, a large number of tests have been

shot for velocity control, and astounding lateral velocity changes are recognized. As a result, the velocities obtained from a single velocity test should not be assumed valid over any large area. Variations of velocities amounting to 1,400 ft. per second within 1 mile are known to exist within the southern limits of the Midland basin. All deep tests should be shot for a velocity survey in order for the geophysicist to solve this problem. Well-velocity data can be used to construct regional velocity-gradient maps that are valuable in converting corrected seismic time values to depths below sea level.

Recent deep production in the Midland basin has emphasized the need for this velocity control. The deeper data are often not continuous, and a system of projecting these data by means of a phantom has sometimes been employed. In many cases the control for the phantom was taken from the Permian or Pennsylvanian data. As a result a map is presented which does not depict the true Devonian or shallower structural conditions, but a composite of both. The deep features in this province are usually small in lateral extent, and their critical closures sometimes exist over lateral areas of 1,500 to 3,000 ft.

It is clear to see how dangerously simple it is for the geophysicist to pass over one of these features if he is confronted with questionable energy, and he, as a last effort, maps a deep phantom horizon based upon persistent shallow data. The problem confronting the geophysicist here is purely one of interpretation, since the Devonian structure is separated from shallower structure by a pronounced unconformity.

Reefing has played and is playing a very important role in the Midland basin. It is known that several of the more outstanding reefs were not mapped by earlier seismic reflection traverses. It therefore becomes increasingly important for the geophysicist to consider closely each individual profile and to recognize any abnormal stepout, character change, or quality change which may be associated with reefing. An abnormal stepout, for example, may be related to a dip that is recorded off the flanks of strata on-lapping against a reef body. A character change or quality change may result from lithological or stratigraphic conditions associated with reefing.

Ozona Platform

The Ozona platform is a portion of the Edwards Plateau. Heretofore this area was generally considered one of NG seismic-reflection recordings. Refraction work has been used here but inherent limitations make the method difficult to interpret and evaluate. The segment of the Ozona platform where the Edwards limestone outcrops on the surface lends itself to seismic-reflection shooting through the use of multiple holes and multiple geophones. Even so, areas exist where no recognizable reflection energy returns are obtained. It is possible that the high ratio of noise to energy return engulfs the signal. Seismic activities in the past have been directed to alluvial-filled valley lows where usable (and in some areas correlatable) energy is recorded. The chief problem encountered in directing a seismic program to topographic lows is the determination of the variable thickness of the alluvium fill. In order to correct adequately for this variable, a deep hole at every setup must be drilled to the Edwards limestone.

"Subsurface studies reveal tremendous possibilities for oil accumulation within the Delaware basin. . ."

Val Verde Basin

Similar problems to those found on the Ozona platform exist in the Val Verde basin. Large-scale seismic and gravity surveys are being conducted in this basin at present. The greater portion of the seismic program is directed within the valley lows. Operators have spent a great deal of exploration time in trying to map this area in detail; to date the challenge is still confronting the geophysicist. Segments of the area, particularly the valley lows, are conducive to producing seismic results which are reliable.

Delaware Basin

Subsurface studies reveal tremendous possibilities for oil accumulation within the Delaware basin. However, exploration activity here is retarded because of the nature of the geological section and the estimated depths of expected reservoir beds. Marginal to nonusable seismic results have not permitted structural evaluations in the basin. A great deal of experimental seismic shooting has been conducted in parts of the basin. The technique involving the use of multiple holes and multiple geophones tends to evaluate some portions of the Delaware basin. Broad-band recording and the use of dropped weights as a source of seismic energy rather than dynamite may help solve the problems of this area.

Lava flows cover the southern extension of the Delaware basin and greatly interfere with the use of geophysical methods.

Gulf Coast Province

In general, the Gulf Coast province consists of the Gulf Coast salt-dome embayment, the Vicksburg flexure, and the offshore area. Seismic results in this area are generally considered fair to good. The outstanding problem facing the geophysicist here is the interpretation of the seismic data. Faulting has been long recognized as an important factor in the formation of traps for the accumulation of oil and gas. The evidence of faulting is not always clean cut even in areas of strong persistent reflected energy. Major faulting is usually discernible on the recorded profile; however, down-to-the-coast low-angle faulting of the order of 100 ft. of displacement is difficult to locate. Only through the detailed examination of the recorded data, together with a close geological consideration of data derived from numerous tests, is it possible adequately to interpret these faults.

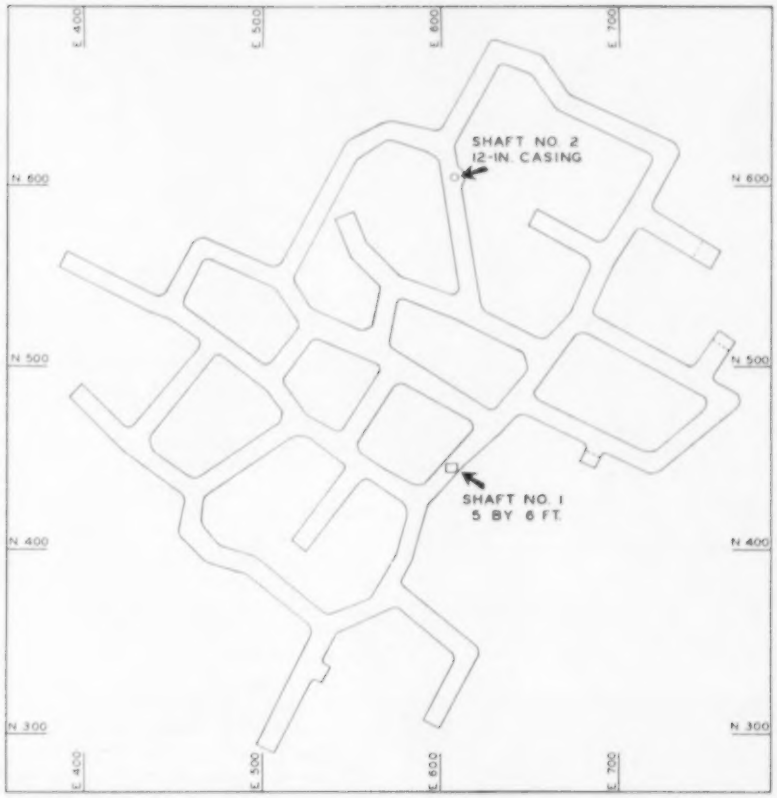
Considerable emphasis has been placed by the oil industry on offshore exploration and development because the offshore area may represent the largest undeveloped oil province of the United States.

Highly specialized equipment and personnel are needed for exploration work in this area. Seismic results are usually from fair to good and it is not unusual for a crew to shoot as many as 3,000 profiles a month. A considerable investment is required to operate an offshore seismic crew and the total monthly cost runs high. However, the large volume of profiles shot lowers the profile cost to considerably under that of the average land crew. Again the main problem, once the operational routine is established, is analyzing and digesting the maze of information derived. The presence of salt domes add to the complexities of the normal Gulf Coast sedimentation section.

The nearby tideland and marsh areas are difficult to explore but the advent of the helicopter, swamp buggies, and other specialized and portable equipment has greatly reduced the inaccessibility of these areas.

Of the total geophysical crews operating in the United States, 31 per cent or 222 crews are at present working in Texas. These figures are indicative of the relative importance of the petroleum provinces of Texas.

"The outstanding problem facing the geophysicist on the Gulf Coast is the interpretation of the seismic data."



PLAN OF PROPANE RESERVOIR, Sinclair Oil & Gas Co., near Seminole, Okla.

SHAFT NO. 2 is made from 12-in. casing and is located about 200 ft. from the main shaft.

INSIDE THE RESERVOIR which was made by excavating blue shale just below the Belle City limestone.

Sinclair completing project for

Underground L.P.G. Storage

Reservoir will hold 5,000,000 gal. of propane

by E. H. Counts and C. L. Childress

AS another step in its continuous effort to supply customers with an ample supply of quality products during peak demand periods, Sinclair Oil & Gas Co. is in the process of completing a 5,000,000-gal. hard-rock underground storage for liquefied petroleum products near Seminole, Okla. *(The Oil and Gas Journal, June 14, 1954, page 100).*

Propane to fill this storage will be supplied from Sinclair's gas products Plant No. 13, which in addition to the raw L.P.G. produced at gas products Plant No. 13, fractionates the raw L.P.G. products from two other Sinclair plants in the Seminole area into propane, isobutane, and normal butane.

Authors are superintendent of operations and superintendent of engineering, respectively, for gas and gas products department, Sinclair Oil & Gas Co.

In order to find a suitable location in the Seminole area to locate the proposed storage, reservoir engineers and geologists studied numerous oil-well logs and surface outcroppings to determine the most promising area in the vicinity of Sinclair's Plant No. 13. Section 9-8n-7e, Seminole County, was selected as the site with the most promise of meeting all the requirements, i.e.; reasonable distance (25,400 ft.) from the plant; deep, dry shale formation overlaid with limestone cap rock; surface acreage clear of improvements, away from population center, near paved highway and near a source of electric power, and in an area where excavated material could be readily disposed. The suitability of this selected site was confirmed by drilling six test wells. Data obtained from the test wells included complete drilling logs, cores on the sandstone, limestone and shale formations, electric logs on all formations, and pressure tests on the sections of the formation to be used for storage.

Mined shaft . . . Conventional mining methods and equipment were used in sinking a shaft 308 ft. deep and excavating the equivalent of 5,000,000 gal. of storage in the dry, blue shale formation to form the reservoir, just below the Belle City limestone, which was encountered from approximately 298 to 308 ft. The mined shaft was lined with cribbing timbers from top to bottom to provide the maximum safety for those entering. More than 2,400 linear

feet of drifts or tunnels, 24 ft. deep and approximately 15 ft. wide, was excavated in two directions from the mining shaft. These first two drifts extended along the strike of the Belle City limestone so that the roof was level. Later drifts were excavated downdip and interconnected at the ends. The floor was sloped upward from the base of the mining shaft to insure proper drainage.

Facilities . . . In order to seal the excavation, some of the cribbing timbers were removed and 42-in. o.d. steel casing was cemented the full length of the mining shaft. This 42-in. casing will be capped with a standard semielliptical head containing an 18-in. i.d. manway, one 6-in. nozzle for the liquid level-gage, and one 12-in. nozzle for 8⅝-in. o.d. casing and a 30-stage deep-well-type centrifugal pump. A liquid-propane inlet nozzle and a vapor-equalizing nozzle will be located just below the head on the side of the 42-in. o.d. casing.

To allow for the installation of a standby pump at a location removed from the main shaft, a 14-in. well was drilled through the Belle City limestone 150 ft. north of the main shaft and 12-in. casing was set and sealed by cementing from bottom to top. An 8⅝-in. o.d. casing string is to be run in both the 42 and 12-in. casings with a foot valve attached to the bottom. The foot valve is designed to give a tight shutoff on the 8-in. casing when it is necessary to pull the deep well pump. An extension on the deep well pump opens the foot valve when the pump is set in place and allows the valve to close when the pump is lifted off its seat.

Operating platforms 10 ft. aboveground are to be installed above each pump to serve as a working area when it is necessary to remove the deep-well pumps or foot valves. It was necessary to use elevated platforms to get above the packers, which will be required when the pumps or the 8⅝-in. casings are pulled under pressure. These platforms are 10 ft. wide and 12 ft. long and designed strong enough for working requirements but not strong enough to allow casing, tubing and pump shafting to be stacked on the floor. The design will allow a servicing rig to be properly set for pulling operation.

Operation

After all equipment is in place, the reservoir is to be tested for leakage with dehydrated air at 150 psig. pressure. Air for this test will be supplied by Plant No. 13 through the 6-in. line, which the plant will use later to transfer propane in and out of the storage.

THIS DERRICK is placed above the No. 1 shaft which measures 5 by 6 ft.

MEN AND MATERIALS were lowered into the cavern through the main shaft while the work was progressing. (Photos by L. F. Dougan.)

Storage . . . Propane transferred to underground storage will be gaged as regular plant storage transfers. The pressure (200 psig.) on the plant storage tanks will transfer the propane from these tanks into the underground storage. Pressure in the underground storage reservoir is expected to be 90 to 100 psig. A pressure controller located in the transfer line near the inlet to the underground storage will maintain sufficient pressure on the transfer line to keep the propane in liquid form. An electrical liquid-level gaging device has been developed to determine the level of product in storage reservoir.

Removal . . . Propane will be removed from underground storage with two 4 by 7-in. deep-well-type centrifugal pumps driven by 30-hp. electric motors. A liquid-level controller on the 10 by 40-ft. aboveground surge-tank site will automatically start and stop one or both deep-well pumps as required. These pumps each were purchased to handle 12,000 gal. per hour and discharge into the surge tank, which is to be equalized with the storage reservoir pressure.

When it is desired to withdraw propane from underground storage, the plant operator will open a valve on the transfer line at the plant into the dehydrator unit. The pressure on the transfer line is thereby reduced and this reduction in pressure causes the 4 by 6-in. vertical transfer pump at the underground storage site to be automatically started. The transfer pump will deliver approximately 12,000 gal. per hour from the surge tank back through the 6-in. transfer line and through a dry-desiccant-type dehydration unit located at the plant. From the dehydrator, the dry propane will go direct to tank-car loading rack or into storage tanks from which tank trucks can be loaded.

Dehydration . . . The liquid propane dehydrator located at the plant is designed for a normal operation of 16 hours drying propane and 8 hours for regeneration. During the regeneration cycle the propane will be evaporated from the contactor tower, condensed, and then accumulated in a tank which is large enough to hold all of the propane contained in the dehydrator system. Te dehydrator bed will then be regenerated with hot vaporized propane contained in the system. After regeneration is completed, the accumulated water will be drawn off from the condensed propane accumulator tank and the propane will be pumped through the dehydrator when tank car loading operations are in progress. The accompanying diagram shows a schematic layout of the completed storage.

To allow the utmost flexibility and assure delivery of product to meet peak demands, all auxiliary equipment was designed to the end that when the installation is completed, the storage could be emptied in approximately 35 days.

HELICOPTER IN DRILLING SERVICE is leased by Gulf Oil Corp. from commercial operator. It makes inspection trips and delivers supplies, equipment, and personnel to rigs and barges scattered along marsh lands.

Whirlybirds—New Oil-Field Work Horse

In addition to dry-land operations, it takes swamps and water in stride

by Robert J. Enright
Southwest District Editor

THE helicopter is rapidly making a name for itself as a versatile, time-saving work horse for the petroleum industry.

It is proving especially useful as a carrier of men and equipment and as a speedy all-purpose tool in exploratory operations in hard-to-reach areas.

One of its earliest oil applications was its use in exploratory survey work in the swamps and marshes of the Gulf Coast. Here it is equipped with floats. It can also be fitted with skid or snow landing gear for operations in mountainous or arctic areas and can set down anywhere where there is sufficient space to accommodate its main rotor blade. It operates equally well in tropical or subzero temperatures.

As far as oil applications are concerned, the most popular 'copter is the small three-place model. A majority of those in oil-industry use today are manufactured by Bell Aircraft Corp. at Fort Worth. Bell's new 200-hp. Model 470 has a range of from 215 to 250 miles and an endurance of about 4 hours at typical gross weights.

The 'copters so far have not been sold directly to an oil company, although manufacturers are interested in making such sales. At present, oil firms seem to prefer to use them under lease from commercial operators—either on an hourly or a job basis.

Applications

As an exploratory tool . . . The helicopter's ability to hover and to land in small areas has been exploited very successfully to speed exploratory surveys for petroleum.

In one gravimeter operation in swampy territory in Louisiana, a 'copter crew established as many as 115 stations a day, whereas the best a ground crew had been able to accomplish was 16 stations a day. In this operation, the oil company was enabled to complete in a month work that ordinarily would have required 5 months and to reduce costs between 40 and 50 per cent per station.

Marsh-buggy crews on straight gravity block surveys can establish 300 to 400 stations a month, sometimes traveling no farther than 3 miles a day. Employing helicopters this figure has been upped to nearly 2,000 stations a month.

It is much the same with seismic surveys. The 'copter frequently increases crew output three times or more.

Here is the manner in which the whirlybird customarily is used in gravity surveys in the marsh country:

Desired station locations are plotted on an aerial photo by the party chief. The helicopter lands at one of these desired locations and, without leaving the cockpit, the observer takes and records a reading. The 'copter then moves on to other locations, numbering stations as it goes. When the day's readings are completed, the party chief plots them on his map and makes the necessary computations.

Where vast stretches of marsh grass make locations of gravity stations on an aerial map impossible, engineer observers with transits work on the ground in coordination with the helicopter. They are spotted on portable towers (carried in and set up by the helicopter) tall enough to get the observer well above the grass which often reaches 10 ft. or more in height. From these towers the observers (usually three) can triangulate in on the 'copter when it lands or hovers for a reading, pin pointing the exact position of all gravity locations in the area. The helicopter, thus, serves as a "fix" point and the pilot as a rodman.

The 'copter in such an operation is generally based on a quarter boat which also serves as headquarters for the exploration party. In addition to participating in the actual surveying work, it also speeds the entire operation by ferrying crew members and instruments to and from work sites. If equipment breakdowns occur after shot-hole drilling begins, the 'copter

This helicopter is operating in the tropical jungles, 450 miles west of Port Moresby, New Guinea.

A Gulf Oil drilling barge, located off the Texas coast, serves as landing space for this 'copter.

is brought into play again to haul the broken part or piece of equipment to and from the repair shop at the quarter boat, thus keeping down time at a minimum.

The 'copters in one survey operation in the Gulf Coast marshes were equipped with cargo carriers slung beneath the fuselage in which they toted a total of 22,000 lb. of dynamite in addition to loading and shooting equipment.

A recent innovation has been the use of the helicopter and scintillation counter in exploring for oil. The technique involves measurement by the air-borne counter of the intensity of radioactive emanations from the earth. Intensity of radiation jumps upward sharply around the extremities of an oil-bearing formation and is lower than normal directly over it.

General Geophysical Co. of Houston uses this machine to string coaxial cable for geophysical instruments.

In transport service . . . Oil companies are making increasing use of helicopters as passenger and equipment carriers in spots where other forms of transport are either unavailable, too expensive, or too slow.

They have been proved practical, for instance, in mapping and surveying heavily forested and mountainous areas in Canada, in offshore drilling operations in the Gulf of Mexico and Lake Maracaibo in Venezuela, and in practically impenetrable jungles of New Guinea and northeastern India.

Gulf Oil Corp. recently launched a new drilling tender at Corpus Christi to drill on its expensive Block 774 tidelands lease 8½ miles off the Texas coast. The tender is equipped with a planned-in helicopter deck on the fantail. The 'copters will be used to taxi drilling personnel from Corpus Christi and Port Aransas to the tender at the drill site. Considerable savings are anticipated in labor payments alone, since drilling crews are on company time going in and out as well as on tour.

Shell is employing two of the craft in 24-hour service to transport personnel as far as 35 miles out into Lake Maracaibo to offshore wells, and drilling rigs and to facilitate remedial work. These ships are flying an average of about 100 hours per month each.

Three 'copters were pressed into service not long ago by Nederlandsche Nieuw Guinee Petroleum Maatschappij to carry dynamite to shot points in the dense jungles of New Guinea.

Small clearings were made at each shot point, which were spaced about 5,000 ft. apart. The 'copters followed the trail of clearings at a height of about 2,000 ft. In the event of engine failure there was sufficient altitude for autorotation to become effective, enabling the whirlybird to reach the nearest clearing.

One of these helicopters carried 99 cases of dynamite to shot points in one day. This task would have required about 3 days for 100 natives to complete, each carrying one case. In addition to their normal dynamite-carrying function, these 'copters also were used to move instruments and drills from one point to another.

'Copters also are being used by oil companies in Australia, India, and other remote parts of the world. Some of the larger users in the petroleum industry, in addition to those already mentioned, include: Ohio Oil Co., Humble Oil & Refining Co., Stanolind Oil & Gas Co., Union Oil Co. of California, Assam Oil Co. (India), Standard Oil Co. of California, General Geophysical, The Texas Co., Socony-Vacuum Oil Co., Ltd., Imperial Oil, Ltd. (Canada), Continental Oil Co., Phillips Petroleum Co., Standard Oil Co. (Ohio), Tide Water Associated Oil Co., Richfield Petroleum Corp., Colorado Interstate Gas Co., and H. C. Price Construction Co.

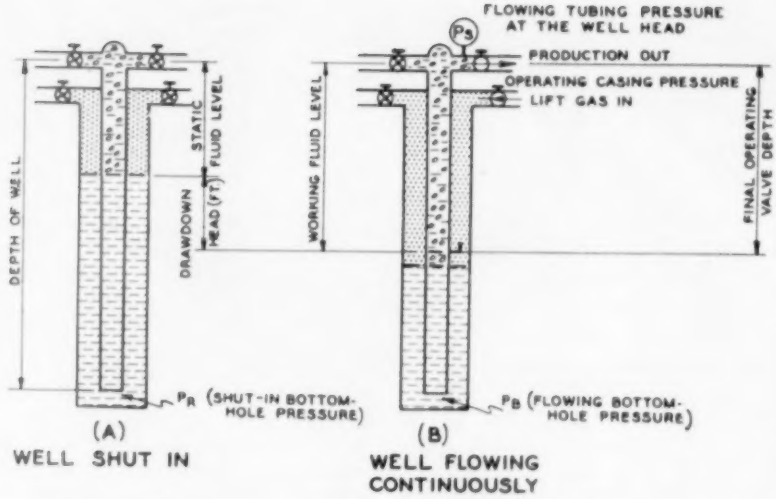


Fig. 1—The basic terminology and concepts of gas lift illustrated schematically.

Efficiency of an individual gas-lift installation is heavily dependent on the proper choice between intermittent and continuous flow. This article, second in the series beginning March 29, evaluates the factors affecting this choice. Regularly appearing in the future will be other installments to consider the individual points of well performance that dictate gas-lift design.

FUNDAMENTALS OF GAS LIFT—2

Which . . . Continuous or Intermittent Gas Lift?

by Prof. C. V. Kirkpatrick

THE primary factors that make up the problem of gas-lift installation design are basically threefold; first and foremost is the determination of the proper category in which the individual well should be placed, i.e. intermittent or continuous flow; second, design of continuous flow installations; and third, design of intermittent installations.

In considering the first problem, that of determining the well category, the solution to date has been primarily an empirical one. For example, it has been suggested that wells having 2-in. tubing and producing up to 250 bbl. total liquid per day, should be designed for intermittent flow and the same wells, producing in excess of 250 bbl. total liquid per day, should be designed for continuous flow. For wells with 3-in. tubing, 400 bbl. total liquid per day is the approximate dividing line.

Further, the maximum operating depth for successful operation of a continuous-flow installation has been arbitrarily set at approximately 4,000 ft., based purely on empirical data. A more realistic approach is accomplished by basing the determination on the productivity index (P.I.) of the well.

Productivity index . . . The productivity index is a measure of the ability of the reservoir to deliver the oil into the well bore. It is the barrels of stock-tank oil produced per 24-hour day divided by the pressure drawdown in the reservoir at the bottom of the well bore, in pounds per square inch. Symbolically it may be expressed as $Q/(P_r-P_b)$ where Q is the stock oil production in barrels per day, P_r is the **stabilized** shut-in reservoir pressure, and P_b is the stabilized bottom-hole flowing pressure.

The limitations of the conventionally defined P.I. are fully recognized but this term, as currently defined, is a valuable criterion in the design of gas-lift installations. Although the productivity index is a most necessary and valuable complement of data, it alone is not sufficient to completely analyze the problem.

A sound approach to the design problem must necessarily make use of fundamental reservoir behavior in terms of volume factors, solution gas-oil ratios, and gas behavior in accordance with the fundamental gas laws.

The positive contribution to date of empirical data as an aid in the solution of the design problem is clear; however, optimum efficiency can only be attained by an analysis which makes maximum use of fundamental work principles, reservoir fluid behavior, and a minimum use of rule of thumb.

In short, a **complete design analysis for both continuous flow and intermittent flow is the only positive way a borderline well can be properly categorized.**

Basic considerations . . . Once it has been determined that a well will be designed for either continuous flow or intermittent flow, then three basic considerations are necessary in order to proceed with the analysis. These considerations are (1) mechanics of the valve operation, (2) spacing of the intermediate valves in the valve string, and (3) the position of the final operating valve.

In a continuous-flow installation the mechanics of the valve operation are dependent upon the type of loading force, i.e. a gas-charged bellows, spring, etc. Operating temperatures affect the pressure in the gas-charged bellows, as well as the pressure exerted by the weight of the column of gas in the annulus. The nature of the gas in the bellows of the valve and of the gas being used for lift purposes also affects the valve operation.

The characteristic of "spread" in a valve, i.e. the difference between the opening and closing pressure as reflected at the surface, is most significant in terms of its mechanical function.

The spring action of the bellows as a contributing element in loading should be recognized. The role of the spring as a loading force in a valve is little understood. However, not all of these factors will be significant in the design of a particular installation. The extent of the contribution of each fac-

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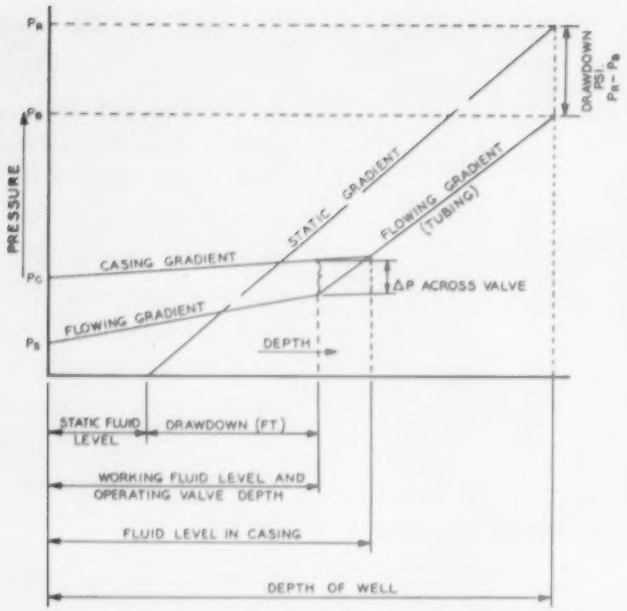


Fig. 2—The terms expressed in Fig. 1 may be shown graphically.

tor will depend upon the nature of the installation.

Spacing . . . The problem of spacing of the intermediate valves in the valve string is a function of the charged pressure of the valve, spread, the available pressure at the well head, the amount and type of fluid being produced, the static fluid gradient, the flowing fluid gradient, and the back pressure held at the well head. Proper interpretation and application of these factors involve an understanding of well-fluid behavior as affected by pressure, temperature, and pipe friction, in addition to straight valve mechanics.

For a given rate of production, **the position of the final operating valve in the string for continuous flow installations is dependent almost wholly upon the correct productivity index** of the well.

In an intermittent-flow installation, the factors that affect the mechanics of the valve operation are essentially the same as those for continuous flow, except that the order of magnitude of the effect may be considerably different. Basically, however, operating temperature, spread, spring action of the bellows, and the role of the spring as a loading force are factors that are present in the intermitting valve.

Spacing of the intermediate valves for both types of installations is essentially the same. During the unloading operation, the intermittent installation is nothing more than a continuous flow installation in most cases.

Determination of the position of the final operating valve in the intermitting system, however, is not the same as the procedure for the continuous-flow operation. Position of the ultimate valve in an intermittent design is determined by the amount of oil produced per cycle, which is in turn determined by the cycle frequency. Cycle frequency is a function of the productivity index.

In addition, the oil produced per cycle is directly influenced by the "ballistic gradient." This ballistic gradient is a function of the static gradient of the fluid in the well, the frictional pipe resistance to the flow of this fluid, the gradient of the injected gas column that is performing the work in lifting the fluid, the gradient of the gas column above the fluid, the back pressure at the tubing, and the initial starting velocity of the fluid slug.

Design Fundamentals and Terms

A fundamental axiom is that no well can produce more oil than its reservoir is capable of delivering. An elementary principle to be sure, but one that accounts for the incorrect design of a great number of wells simply because it is not observed. This means that the correct P.I. of the well is the single most important factor in the design.

Figs. 1 and 2 illustrate basic concepts and terminology for a well in its static state and aided by gas lift. It is to be noted that the flowing gradient below the operating valve is less than that of the static gradient. Under certain well conditions, this difference may be insignificant, and particularly so in the case of wells making substantial amounts of water. It may be significant, however, in high-gas-oil-ratio wells. This gradient can be reasonably established without pressure-bomb survey data, as will be demonstrated in the design examples.

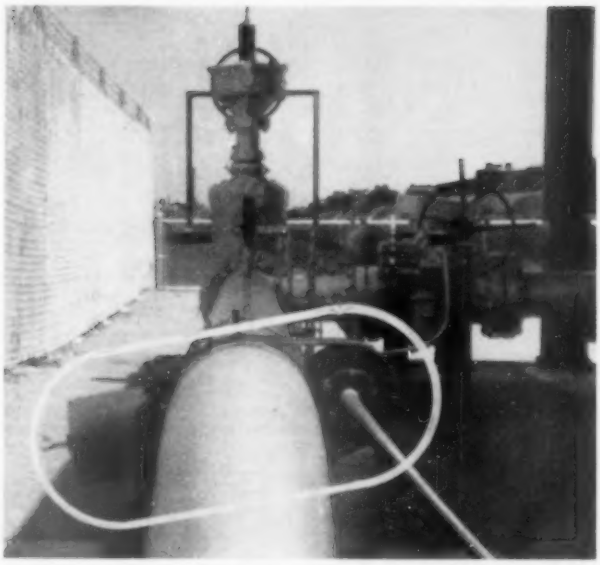
The general characteristics of the intermittent, slug, or ballistic type flow are much more complex than under continuous flow conditions. The flowing gradient may have predominantly nonturbulent (streamline) characteristics until the slug of liquid hits the surface; or it may have predominantly streamline characteristics initially that become completely turbulent before the slug hits the top; or finally, it may have predominantly turbulent characteristics throughout its flow period.

Many wells lend themselves readily to classification outside of the borderline category. For many others, however, it is difficult to determine the correct design for maximum well performance, and a complete analysis must be made for both continuous and intermittent flow, under the desired conditions, before the category can be correctly determined.

Yardstick . . . Horsepower is the principal yardstick in determining the efficiency of a gas-lift-well installation. Therefore, an analysis that will allow a comparative estimate of the horsepower efficiency of two different well installations would seem necessary before final selection of the specific type of installation is made.

There are four basic reservoir conditions that may be encountered in any given well installations. These are (1) high P.I., high b.h.p.; (2) high, P.I., low b.h.p.; (3) low P.I., high b.h.p.; (4) low P.I., low b.h.p. The words high and low as used here are purely relatively terms and it is difficult to give actual delineating values for more complete distinction. For purposes of clarifying the P.I. classification, however, wells having a P.I. of 0.50 or less, will be classified as low-P.I., wells and those with a P.I. greater than 0.50, will be classified as high-P.I. Specific classification of reservoir pressures is even more difficult. In many areas, pressure under 1,000 psi. would fall in the low category, whereas in other areas 500 psi. may be the dividing line. It is to be recalled that gas lift is currently operating in reservoirs whose pressure varies from 35 to 4,000 psi.

The reservoir conditions as set out above may in themselves be ample information for the determination of the mechanical type of well installation as regards the necessity check valve and/or a packer in the well. Generally, however, this decision should be deferred until after the complete design calculations have been made.



Installation of the gravity-measuring Gammagage at Trans Northern's Toronto terminal. Source and detector are held to pipe by steel straps.

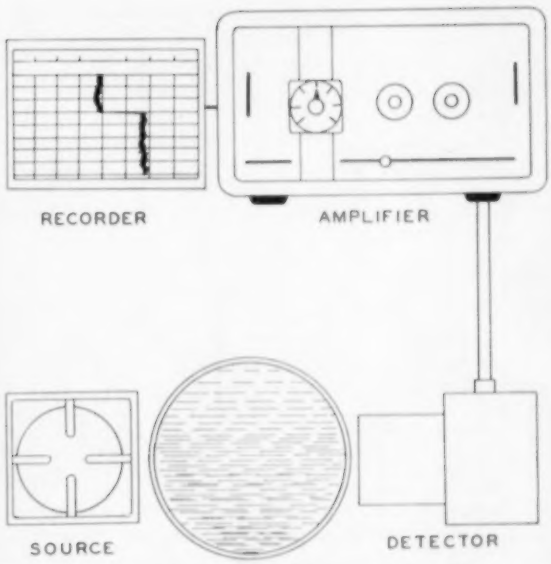


Fig. 1—Schematic arrangement of equipment for determining products gravity. Instrument will fit on lines from 3 to 36-in. diameter.

Trans Northern uses radiation techniques for

Gravity Measurement on Products Line

New technique, using a radioactive source and electronic detector, holds promise as a more accurate means of measuring gravity of pipeline stream

by D. C. Brunton* and T. P. Pepper†

DIRECT and continuous measurement of product gravity by radiation methods has been successfully performed on a products pipeline of Trans Northern Pipe Line Co. The measurement was by a new instrument, the Density Gammagage, of Isotope Products, Ltd., which measures gravity of the contents of a pipeline or a tank by the absorption of a gamma-ray beam from a radioactive source. The source is placed on one side of the pipe and a high-sensitivity, high-stability radiation detector picks up the transmitted beam on the other side of the pipe.

The signal from the detector is displayed on an indicating meter or pen recorder and its magnitude depends only on the total mass of material between the source and detector. The instrument may be fitted to any size pipe from 3-in. to 36-in. A setup control provides for adjustment to any size pipe in this range and to the thickness of the steel wall. A second control provides for expansion or contraction of the scale to cover different gravity ranges. A typical arrangement is illustrated in Fig. 1.

The gage employs a second radioactive source and detector in opposition to the measuring pair to provide the high stability of null-balance measurement. The accuracy of the gage is dependent on the pipe diameter and pipe of approximately 24-in. diameter provides optimum conditions for petroleum products. Under such conditions an accuracy of ¼° A.P.I. may be readily obtained while on a 10-in. pipe, for example, the accuracy is reduced to ½° A.P.I.

Application on product line . . . The installation on the line is extremely simple since both source and detector are external to the pipe and provision need only be made for rigid mounting. In this case a sufficiently rigid mounting was obtained by using two steel straps around the pipe to support both source and detector.

No sampling or bypass lines are required; in fact, no connection whatsoever is made to the pipe, yet the total flow through the pipe is measured. It is quite practical to place the gage head underground and, if desirable, to place it on the line several hundred feet before the metering station in order to provide an advance warning of batch changes.

Test results . . . The initial trials of this equipment were made at the Toronto terminus of the Trans Northern pipeline and covered a period of 2½ months operation. For most of this period, the gage was set up as a direct-reading gravity instrument covering the range 25° to 75° A.P.I. on a Bristol Dynamaster wide-strip chart recorder. With this scale, all the products flowing in the pipeline could be registered but the smaller changes of gravity, i.e. 0.5° A.P.I. or less, were not readily discernible.

Fig. 2 shows a typical recording of product changes. The gravity of each product may be obtained directly from the recorder reading. In addition the chart supplies a record of line operation giving the time of product changes and the duration of each run. Fig. 3 shows a plot of the Density Gammagage reading versus A.P.I. gravity by hydrometer measurements. These points

* President of Isotope Products, Ltd., Oakville, Ont., and †general manager for Isotope Products in the United States.

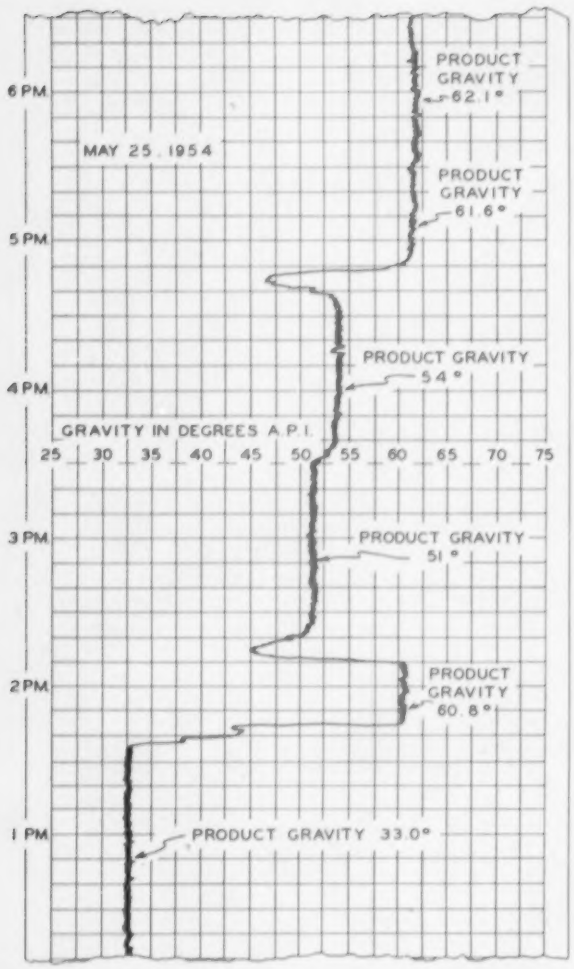


Fig. 2—Chart record of products gravity over a 6-hour period and four batch changes.

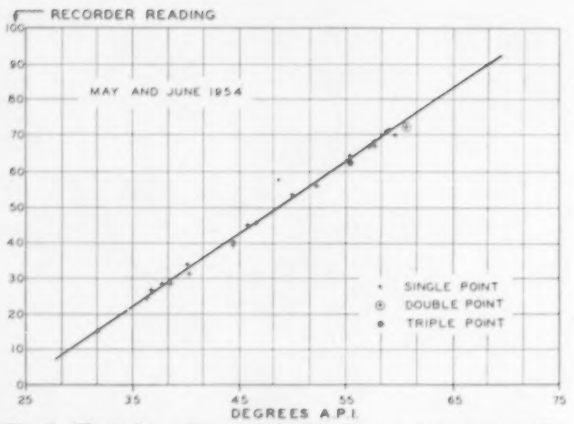


Fig. 3—Chart shows linear relationship between instrument reading and products gravity.

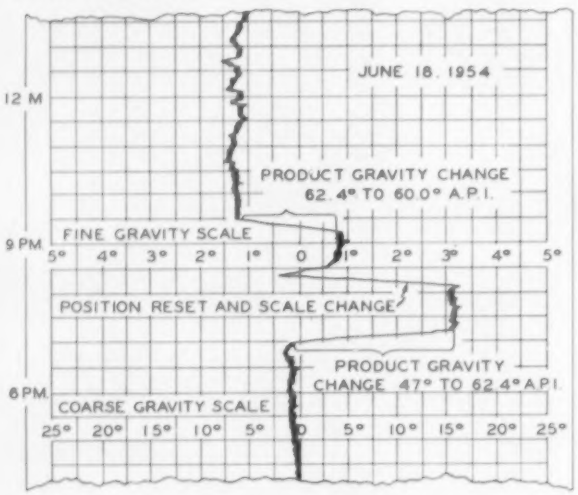

12 M
9 PM
6 PM
JUNE 18, 1954
PRODUCT GRAVITY CHANGE 62.4° TO 60.0° A.P.I.
FINE GRAVITY SCALE
5° 4° 3° 2° 1° 0 1° 2° 3° 4° 5°
POSITION RESET AND SCALE CHANGE
PRODUCT GRAVITY CHANGE 47° TO 62.4° A.P.I.
COARSE GRAVITY SCALE
25° 20° 15° 10° 5° 0 5° 10° 15° 20° 25°

Fig. 4—Use of expanded gravity scale allows operator to detect changes of a few points in gravity.

plotted in this figure covered 5 weeks of operations and the result shows a linear relationship between gage reading and gravity. (The small deviations of some points from the gravity curve were caused by an element in the balancing network that was slightly sensitive to temperature changes and which has since been eliminated from the gage.) In this operation the gage responded without exception to all product changes.

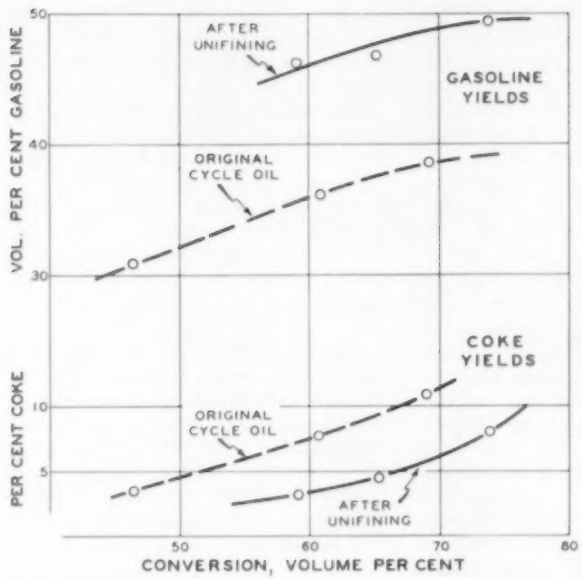
Use as cut indicator . . . In order to show very small changes in product gravity without ambiguity so that the gage might be used to establish the cut point on small grade changes, it was necessary to provide a means for expanding and contracting the gravity scale. Consequently, for this type of operation, the gage was set up with three ranges—± 25° A.P.I., ± 10° A.P.I., and ± 5° A.P.I. One-half hour or more before the change was due, the operator would set the gage to read approximately center scale and would set the scale range according to the gravity change expected.

For example, on a change from 60° to 61° A.P.I. product, the gage would be set to read approximately center scale on the 60° product and with a ± 5° A.P.I. range. The operator would then know that on this change, the recorder would move two divisions towards higher gravity (5° equaled 10 divisions on the chart) and therefore his cut point would be established when the recorder pen had moved over one division. With a large gravity change, the operator would of course set the gage on the course range in order to avoid running off the chart. This type of operation was found most helpful to the line operators for establishing accurate cut points on all gravity changes.

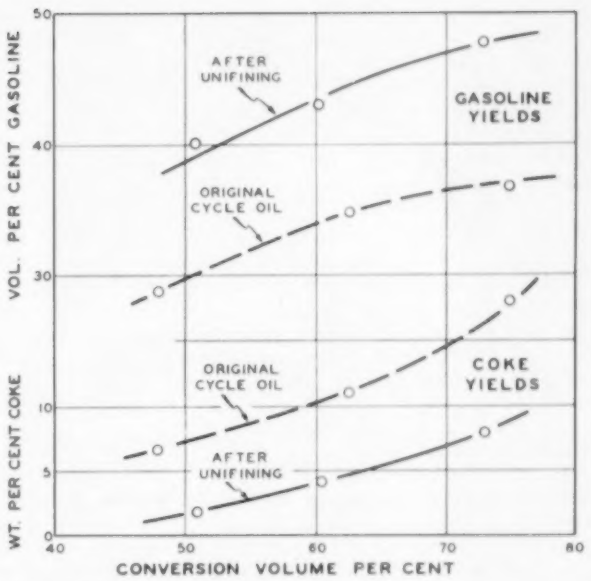
Fig. 4 shows typical operation of the Density Gammagage as a cut indicator. The gage was approximately centered for a 47° product and operated on the ± 25° A.P.I. scale. At 7:00 p.m. the product changed to 62.4° which moved the indicator 6¼ divisions up scale. At 8:20 the gage was recentered and changed to the ± 5° A.P.I. scale. At 9:25 p.m. the gravity changed to 60.0° and the gage moved 4 divisions down scale. Both the large and the small breaks are shown clearly on the chart.

These trials have definitely established the validity of the radioactive principle and the use of the Density Gammagage for gravity measurement of petroleum products. They have also determined a useful operating procedure for the application of this equipment to product batching on pipelines.

The gage is simple in principle, easy to operate, and requires a minimum of maintenance. It is constructed along the same design as the Betameter gages of Isotope Products, which are being used at nearly 100 installations in the United States and Canada on the measurement and automatic control of industrial processes.



Effect of Unifining light cycle oil on fluid catalytic cracking yields. Fig. 1.



Effect of Unifining heavy cycle oil on fluid catalytic cracking yields. Fig. 2.

PROGRESS REPORT . . .

Unifining Upgrades Distillate Fuels

by J. G. Eckhouse, C. F. Gerald, and A. J. de Rosset

THE middle petroleum distillates can be upgraded by Unifining in these respects:

- Over 90 per cent of the sulfur present in straightrun distillates is removed.
- Most of the sulfur in thermally cracked distillates is removed, and color and stability characteristics are improved.
- Unifining of cycle oils effectively removes sulfur, increases stability, and increases gasoline yield and decreases coke production on subsequent catalytic cracking of the stock.

In general, the Unifining process performs the hydrogenation-refining of petroleum fractions by passing a mixture of hydrogen-containing gas and feed over a specially developed catalyst. Process description, flow sheet, chemistry of the process, and results on treating a number of different stocks have been presented in a previous article in The Oil and Gas Journal.[1]

This article presents additional information on upgrading the middle distillates.

Authors are with Universal Oil Products Co. Paper presented at W.P.R.A. meeting, Alma, Mich., 1954.

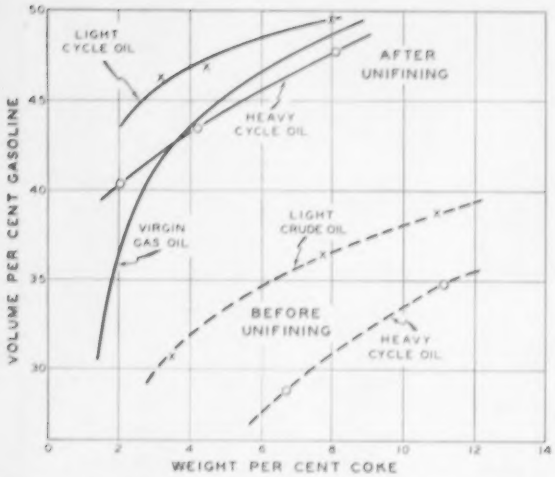
Straightrun Distillates

In Table 1 are shown data on desulfurization of two virgin diesel oils. The first two columns of data show inspections on charge and product when Unifining a 702° F. end-point diesel from Wyoming crude. Over 90 per cent of the sulfur is removed, the sulfur content being reduced from over 1 per cent to 0.08 per cent. Bromine number is reduced to a low value and color is improved. Phenols and thiophenols, which are sometimes associated with instability, are largely removed.

The columns of data at the right side of Table 1 show the effect of Unifining an Arabian diesel cut. Again sulfur removal was above 90 per cent, but in this case the relatively low bromine number of the charge was unchanged. Color was improved significantly. For both of the charge stocks, liquid yields above 100 per cent were observed. There is no end-point rise when Unifining such stocks.

TABLE 1—DESULFURIZATION OF STRAIGHTRUN DIESEL OILS BY UNIFINING

	Wyoming diesel oil		Arabian diesel oil	
	Charge	Product	Charge	Product
Gravity, °A.P.I.	31.5	34.0	37.5	39.9
A.S.T.M. distillation, °F.:				
Initial	424	410	363	353
10 per cent	448	438	403	
50 per cent	510	503	520	
90 per cent	599	610	656	
End point	702	676	694	690
Total sulfur, weight per cent	1.06	0.08	0.99	0.096
Mercaptan sulfur, weight per cent	0.0347	0.0001		
Bromine number	6.6	0.9	1.7	1.6
A.S.T.M. photocolor	89.0	95.9	91.0	96.0
Phenols, weight per cent	0.021	0.0046		
Thiophenols, weight per cent	0.006	0.0005		
Cu corrosion, 122° F.				0
Cetane number	46.2		56.0	56.8
Liquid yield, volume per cent charge		100.2		100.1



Effect of Unifining cycle oils on fluid catalytic cracking yields. Fig. 3.

Distillates of Thermal Origin

Distillates derived from thermal cracking or residuum coking generally present greater difficulties than straight-run materials. In general, the sulfur content of the cracked distillate is about the same as the sulfur content of the corresponding cut from the crude. Hence some degree of desulfurization is frequently desired.

The major marketing problems arise, however, from poor stability and poor color. Both of these difficulties are caused by the presence of unsaturated, reactive components which by reacting with oxygen during storage develop gums, sediment, and color bodies. These oxygenation reactions are thought to be accelerated by the presence of small amounts of other materials normally present, such as thiophenols and pyrroles.

Unifining, since it saturates the reactive olefins and decomposes a substantial part of the impurities that accelerate the oxidation reactions, can give very stable fuel oils. Concurrently, the good desulfurization abilities of the process give products of very low sulfur content.

Table 2 gives Unifining results on two distillates produced by thermal processes. The first, a distillate originating from visbreaking of Mid-Continent crude bottoms, was converted from an unstable material to a very stable fuel oil component of good color. Bromine number was reduced from 45 to 3 and sulfur was nearly completely removed, from 0.45 weight per cent to 0.02 weight per cent. The A.P.I. gravity was significantly increased, with only minor changes in distillation characteristics.

The second stock described in Table 2 was derived from delayed coking of Oklahoma reduced crude. The original coker distillate was greatly improved in color and unsaturates were largely hydrogenated by Unifining. Even though this coker distillate is considerably higher boiling than the visbreaker material, sulfur removal is very high.

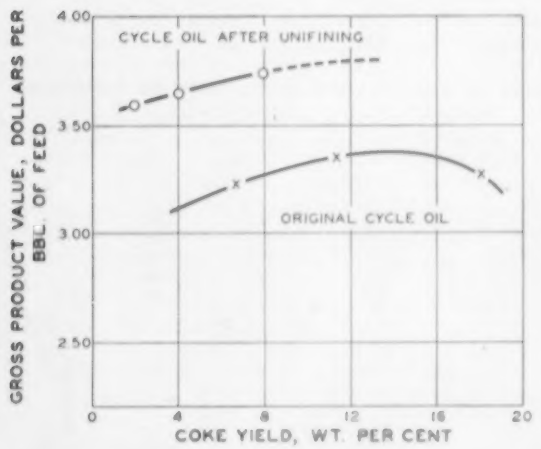
Storage-stability tests have not been run on this stock, but the change in bromine number and in aromatics plus olefins indicates substantial stability improvement. For both the charge stocks listed in Table 2, the odor was greatly improved by the Unifining treatment. Liquid yields were above 100 per cent.

Unifining of Cycle Oils

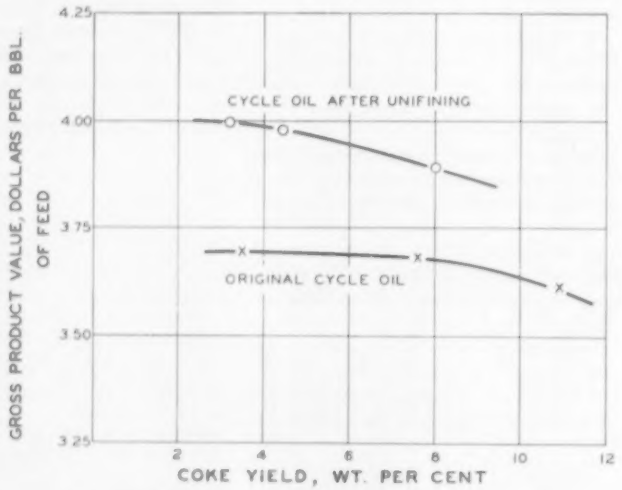
Inclusion of catalytic cycle oils in diesel fuels is generally economically

TABLE 2—UNIFINING OF CRACKED MIDDLE DISTILLATES

	Mid-Continent visbreaker distillate		Oklahoma coker distillate	
	Charge	Product	Charge	Product
Gravity, °A.P.I.	37.3	39.2	34.9	36.9
A.S.T.M. distillation, °F.:				
Initial	365	350	360	320
10 per cent	411	404	414	402
50 per cent	450	446	536	536
90 per cent	510	507	660	670
Maximum	563	567	704	726
Total sulfur, weight per cent	0.45	0.02	0.53	0.08
Bromine number	45	3.0	25.8	4.0
Aromatics plus olefins, volume per cent	58.9	29.1	50.9	27.1
A.S.T.M. photo color			Very dark	86.5
A.S.T.M. union color:				
Initially	5	Lt. 1		
After 6 months storage	5	1		
Steam jet gum, mg./100 ml.:				
Initially	10	1		
After 6 months storage	24	1		



Gross product value from cat cracking heavy cycle oil. Fig. 4.



Gross product value of cat cracking light cycle oil. Fig. 5.

desirable, but stability is here a common problem. The poor ignition quality is also a severe limit to the amount of cycle oil that can be included. Unifining of cycle oils increases cetane number and A.P.I. gravity, improves stability, and reduces sulfur content.

Table 3 shows the upgrading in these respects of a Wyoming catalytic cycle oil. The 26.2° A.P.I. charge with 0.83 per cent sulfur is converted to a 31.7° A.P.I. product with only 0.015 per cent sulfur. Cetane number increase of nearly six units was secured, from 36.7 to 42.3. Olefins are largely saturated, as shown by the reduction in bromine number from 18.4 to 3.7. The carbon-hydrogen ratio is decreased significantly, from 7.75 to 6.96. The product from Unifining would make a superior fuel-oil component, or could be included in diesel-oil blends to a much greater extent than the original charge.

Catalytic cracking results . . . Catalytic cracking of cycle oils after Unifining has been investigated in bench-scale, fluid units at several different conversion levels. Table 4 gives inspections on a light cycle oil before and after Unifining, and Fig. 1 shows the results of comparative cracking tests on the same Mid-Continent light cycle oil.

It can be seen that at the same conversion level, the coke formed from the Unifining unit product was materially less, and the gasoline yield more, to the extent that the product after Unifining behaved somewhat like a virgin gas oil of comparable boiling range from the same crude. For example, at 60 per cent conversion level, coke yield is reduced from 7.0 weight per cent before Unifining to 3.3 weight per cent after Unifining and C_5-400° end-point gasoline yield is increased from 36.6 to 45.3 volume per cent.

Table 5 shows properties of a Mid-Continent heavy cycle oil before and after Unifining and Fig. 2 shows results on catalytic cracking of each of these stocks. Here again it can be seen that at the same conversion level, gasoline yields materially increased, and coke yields decreased, to values which would be expected from virgin feeds. Coke yields at 60 per cent conversion, before and after Unifining, are 10.7 and 3.8 respectively. Similarly, gasoline yields at 60 per cent conversion are increased from 33.9 to 43.0 volume per cent.

In a given operating unit, maximum throughput is generally determined by its coke-burning capacity. Accordingly, it is more appropriate to compare product yields at the same coke make. This is done in Fig. 3 which plots gasoline yield vs. weight per cent coke for the same cycle oils. In addition, the same relationship is shown for the virgin charge stock from which the cycle oils were derived. The virgin feed was a wide-boiling-range (520°-904° F.), 29.5° A.P.I. Mid-Continent gas oil. The light cycle oil had a boiling range of 398°-604° F. and the heavy cycle oil a boiling range of 539°-725° F. These differences in boiling range should be kept in mind in analyzing Fig. 3.

This figure shows that at a specific yield of coke, the gasoline yield from the cycle oils after Unifining is comparable or better than that from virgin charge. For example, at 7 weight per cent coke, gasoline yields from heavy cycle oil before and after Unifining are 29.2 per cent and 46.7 per cent respectively, versus 47.9 per cent for virgin feed. Yields from light cycle oil at the same weight per cent coke are 35.6 and 48.8 per cent respectively.

TABLE 3—UNIFINING OF WYOMING LIGHT CYCLE OIL

	Charge	Product
°A.P.I.	26.2	31.7
Distillation:		
I.b.p.	452	398
10 per cent	479	448
50 per cent	529	514
90 per cent	590	584
E.p.	632	640
S. weight per cent	0.83	.015
Br. No.	18.4	3.7
A + O	51.7	41.5
C/H ratio	7.75	6.96
Cetane No.	36.7	42.3

TABLE 4—UNIFINING OF LIGHT CYCLE OIL

	Mid-Continent light cycle oil before Unifining	Cycle oil after Unifining
°A.P.I.	29.7	33.2
Sulfur, weight per cent	0.19	0.05
A.S.T.M. distillation:		
I.b.p.	480	280
10 per cent	506	425
50 per cent	546	524
90 per cent	588	597
E.p.	618	617

TABLE 5—UNIFINING OF HEAVY CYCLE OIL

	Mid-Continent heavy cycle oil before Unifining	Cycle oil after Unifining
°A.P.I.	26.5	32.1
Sulfur, weight per cent	0.47	0.07
Vac. distillation:		
I.b.p.	539	270
10 per cent	600	552
50 per cent	644	624
90 per cent	707	702
E.p.	725	724
Conradson carbon, weight per cent	0.065	0.01

Economics . . . Unifining is a relatively low-cost catalytic process, from both the operating and investment-cost standpoint. Total operating costs exclusive of depreciation, interest, or income taxes, normally run about 10 cents per barrel of feed where hydrogen is available from a catalytic reforming process at fuel-gas value. For a Unifining unit designed specifically for cycle-oil charge, investment costs should be less than $150 per daily barrel of feed capacity for a 2,500-bbl. per day unit or larger.

The economics of this application will vary from one refinery to another, and must be carefully adjusted to the specific refiner's situation. However, some review of the potential economics is in order. In Fig. 4 are plotted gross product value vs. weight per cent coke for catalytic cracking of heavy cycle oils before and after Unifining using the data previously discussed. Similar data for light cycle oil are shown in Fig. 5. Product values used were as follows: Fuel gas, 25 cents per million B.t.u.; 10-lb. R.v.p. unleaded cat gasoline, $4.50 per barrel; butylenes, 10 cents per gallon; excess butane, $2.50 per barrel; light cycle oil, $3.25 per barrel; and heavy cycle oil, $2.50 per barrel.

Assuming again that coke burning is limiting on the cat cracker, increased product value on cat cracking heavy cycle oil after Unifining, at 8 per cent coke yield is approximately 48 cents per barrel and for light cycle oil at 5 per cent coke yield is about 34 cents per barrel. Deducting operating costs of 10 cents per barrel plus capital charges calculated at 5 years' depreciation and 4 per cent interest, from the above differential product realizations leaves a gross differential profit of about 27 cents per barrel for heavy cycle oil and about 17 cents per barrel for light cycle oil which represents payout times on investment of less than 2 years.

Naturally, these numbers only hold where the cycle oil is currently being cracked. While this is generally the case with heavy cycle oil, light cycle oils are normally sold as fuel oils rather than recycled.

Commercial installations . . . To date there have been about 15 Unifining units licensed with a total charge capacity in excess of 100,000 bbl. per day.

Acknowledgment

The authors gratefully acknowledge the assistance of various members of the technical staff of Universal Oil Products Co. in preparing this paper.

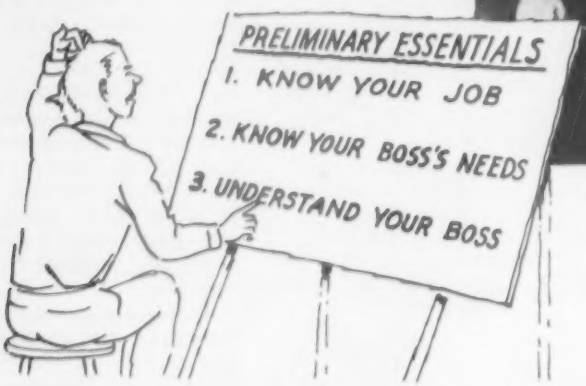
Reference

1. "Unifining . . . A New Petroleum Process," by H. W. Grote, C. H. Watkins, H. F. Poll, and G. W. Hendricks, The Oil and Gas Journal, page 211, April 19, 1954.

Bone up on

What Your Boss Wants to Know

...and give it to him—straight!



by Prof. Robert D. Gray

MOST articles and books on any aspect of employer-employe relations are addressed to supervisors and managers and are focused on how to deal with employes or what to do for employes. This article reverses the usual pattern and gives suggestions on what an employe or a supervisor should do for his boss. Before you mark this article as "must reading" for your subordinates, perhaps you should scan it for some ideas as to how to improve relations between you and your superior.

One of the cardinal rules to follow in getting along with your superior can be summarized as: "Never let your boss be surprised." This means that your boss should hear first from you about any unusual success you have had or any unusual service you have extended to subordinates, associates, or customers. It also means that he should hear about your boners from you rather than by stumbling on them himself or hearing of them through the grapevine. In short, a great deal of your success on your job will depend on keeping your boss informed.

Preliminary Essentials

In order for you to fulfill the obligations and duties which are inherent in your position and in order to keep your superior informed so that he will not be surprised, you must master three preliminary essentials:

1. Acquire a knowledge of the duties and responsibilities of your position.
2. Understand the needs (the accountability) of your superior.
3. Understand your superior.

Knowledge and responsibilities . . . Keeping your boss informed does not mean that you should try to substitute for the daily newspaper or for a trade or professional magazine. You are not expected to keep him informed on world events or general economic conditions. Neither are you expected to be an essential link in the grapevine and pass on to him rumors or gossip within the organization. It is, however, your responsibility to see that he is not surprised about the duties and responsibilities which have been assigned to you.

The chances are that you have received a job description. Have you read it recently? In one way or another you probably have a fairly clear idea of what is involved in your position. If this is not clear to you, you should seek an early discussion with your superior to clarify your duties and responsibilities. It is impossible to do a job unless one knows what that job is.

Many job descriptions, however, do not clarify the three degrees of delegation of authority and responsibility. A few things may have been delegated to you completely and you may have the entire responsibility for carrying them out. This complete degree of delegation implies that you have the authority and the responsibility to make decisions on certain problems without reporting them to your superior. Many persons assume that everything that is delegated to them is in this category. The truth of the matter is that only the most routine items can be so classified.

Most of the work which has been delegated to you will be in a second category: you have been delegated the authority and responsibility to take action on certain problems, but it is expected that you will report your actions to your superior. It is usually not necessary to report each decision as it is made; the reporting can be accomplished through regular, periodic reports which may be made daily, weekly, monthly, or even annually. On the other hand, any decision in this category which is of an exceptional nature and which may involve your superior should be reported to him directly and immediately on a special report.

Most job descriptions list merely the duties and responsibilities which are completely assigned to you or which are delegated to you with an implication that you should report your decisions from time to time. Actually, however, every job also includes an implied delegation of authority and responsibility to make recommendations on any other subject that affects the operations of your job, of related jobs, your department, and of the company as a whole. Every employe, and espe-

ALL WELLS ON THE MAYFAIR LEASE.... NEED COUNTER-BALANCING
THE PLANS FOR THE HEAT EXCHANGER CLEANING PROGRAM ARE 90% COMPLETE
THE BOSS

cially everyone in management, should recognize his obligation to make suggestions on any problem or situation that may come to his attention.

When you list all of the matters that have been definitely delegated to you and when you consider the larger number of subjects on which there is an implied responsibility for you to make suggestions, you can realize that there is a great amount of information resulting from the duties and responsibilities of your position that should be passed on to your superior.

Understanding superior's needs . . . One of the commonest errors in management is to assume that delegation of authority and responsibility means that the authority and responsibility have been passed from one person to another. You may think that the duties and responsibilities which have been delegated to you are now your problem and are no longer of any concern to your superior. You may likewise feel that the matters which you delegate to your subordinates are now their problem and should not concern you. Such is not the case. It is important that both authority and responsibility be delegated and redelegated until they reach the lowest possible level. These actions are necessary in order that decisions can be made promptly. But no one can "wash his hands" of a problem by delegating it.

The board of directors of your company has certain authority and responsibility which have been delegated to it by the stockholders. All authority, however, has not been delegated to the board of directors. For example, it is usually necessary to have the stockholders of a company approve a pension plan. The board of directors in turn delegates certain authority and responsibility to the officers, and they in turn delegate it to their subordinates. Usually, and unless there is a specific provision to the contrary, one may delegate to a subordinate any authority and responsibility which have been delegated to him.

In spite of the delegation of this authority and responsibility, the board of directors is still responsible to the stockholders for the effective operation of the company; in turn the officers are accountable to the board of directors and certain executives are accountable to the officers. Everyone is still responsible or accountable for what has been delegated to him even though he in turn has delegated it to somebody else.

It is important to understand this in order to realize that your superior needs to know what decisions you have made. It is not just idle curiosity on his part that makes him want reports from you as to what you have been doing. Your superior is, in turn, having to report to his superior about the decisions which he has made, and he must include as his decisions the ones you have made. If you realize that your boss is responsible for your decisions and actions, that he must account to his superior for his own actions and also for your actions and the actions of your subordinates and the actions of others in your department, you can see the necessity of keeping your boss informed.

Understand your superior . . . In addition to understanding the accountability or needs of your superior, it is essential that you understand your superior as an individual. This understanding may affect the form and kind of your reports. For example, if he likes charts you should try to present as much material as possible in that form. On the other hand, if he does not like to read graphs, then the material should be presented to him in some other form. If your boss is color blind, you should not use colors on charts. If he is hard of hearing, the reports should usually be written. On the other hand, if his eyesight is failing, give him as many oral reports as possible.

If he is scheduled to leave on a business trip or on his vacation, make your reports as far in advance as possible. Only the most urgent matters should be taken up with him when he is ready to leave. Likewise when he returns, and if you know that his desk is piled high with an accumulation of items, give him a chance to get settled before you report minor items. Urgent items, however, should not be delayed in being reported to him. At times it may even be proper to make this report to him by letter or by telephone while he is on his trip, or even while he is on his vacation. You must use judgment, but presumably you have judgment or you would not be holding your present position.

What to Report

The large number of specific duties and responsibilities which have been assigned to you, and the even larger number of general responsibilities which are inherent in your position can be divided into four main categories. These categories are helpful in planning what to report and when to make the report:

1. Progress on long-term or continuing projects.
2. Completion of assignments.
3. Deviation from approved plans.
4. Anticipated problems.

Progress on long-term projects . . . Some of your specific duties may include work on projects which can be classi-

fied as continuing or long-term. You may even feel that some parts of your work are never completed. If your boss is to know what is going on, he should receive periodically a progress report from you. Many of these progress reports can be reduced to a special form. There may be some items on which, or there may be certain occasions when, he needs a daily report on progress. Other subjects may be properly reported weekly, biweekly, monthly, quarterly, semi-annually, or even annually. It is well to discuss some of these items frankly with your superior in order to find out just how frequently he wants to know how the work is progressing. His request for periodic reports may be influenced by the date of reports that he has to make at departmental conferences or in other forms.

Completion of assignments . . . In addition to keeping your superior posted on how work and other assignments are progressing, it is necessary for you to let him know when specific jobs or assignments have been completed. Most executives have learned through bitter experience that it is what attorneys call "an assumption contrary to the facts" to assume that a job has been done because someone was told to do it.

Have you ever griped about your boss not complimenting you on a job well done? This is a frequently expressed complaint among employes and supervisors. In making this complaint it never occurs to the person involved that the failure of a supervisor to compliment his subordinate upon a job well done may be really the subordinate's fault. It is so easy to blame someone else. But how can a supervisor give credit where credit is due when he does not know that any credit is due?

If your superior assigned a task to you and then later complimented you upon its completion, and if you knew that you had not completed the assignment, you might think that your boss had made a mistake or that he was pretty dumb or you might even think that he was being sarcastic. Your boss can't compliment you until he knows that the work has been completed. If you want to receive credit for completing an assignment, it is up to you to let your superior know that the assignment has been completed. If you do not want to be nagged as to whether or not a job has been done, it is up to you to see that your boss knows how you are getting along on the job, and also that he knows when it has been completed.

No one can guarantee that you will receive praise for completing your assignments. Your boss may think that one of the reasons why you are paid is to complete assignments, and he may feel that if you receive your paycheck regularly you are being complimented sufficiently. More and more supervisors are beginning to realize, however, that praise when praise is due is an essential part of good management. While reporting on the completion of assignments may not insure proper recognition, the failure to report such assignments will certainly result in your not receiving any credit for performing the job. Many of your completed assignments can probably be reported in the form of regular periodic reports. Certain special projects assigned you, however, may require the submission of a special report indicating that your assignment has been completed. If you have been engaged in a continuing project on which you have submitted one or more interim or progress reports, the final report should clearly indicate that in your estimation at least the assignment has been completed.

Deviations from approved plans . . . Subjects so far discussed upon which you should report to your superior emphasize the "good" things: progress on continuing or long-term projects and completion of assignments. The third type of subject to be covered in reports may not be so pleasant.

You and your boss may have agreed upon a definite schedule of work or you may have mapped certain plans involving production or maintenance or some other phase of your activity. Or you may merely have been handed a schedule of work. Regardless of how the schedule was developed, you do know that you have certain procedures to be followed or certain deadlines to be met or you know that you are to perform certain jobs in a certain sequence.

Suddenly you are aware of the fact that it is going to be necessary to deviate from these approved plans. It may be because of illness of a key worker, or delay in receiving parts from a supplier, or because of a breakdown of equipment. What are you going to do?

At this point it is important for you to know how much authority and responsibility have been delegated to you. This is clearly not a matter of taking action without a report. The chances are that this is a situation in which you should take action, but make a report. It is possible, however, that this is a situation in which you should make a recommendation to your superior. Whether you are empowered to take action or not, it is imperative that you make an immediate report to your superior.

The necessity for a deviation from the approved plans as far as your operations are concerned may require other changes in other plans effecting other sections or departments. The quicker your boss knows about this change, the easier it will be for him to prevent this problem, regardless of how large or small it may seem to you, from snowballing into a major problem. Your boss, if he is aware of the deviations that have been made and the reasons for them, may be in a position to suggest an alternative course of action, or, he may be able to authorize other changes which will help to compensate for this necessary deviation.

There are two types of situations which should be classified as deviations from approved plans: (1) lack of progress and (2) mistakes or boners. Both

of these situations may call for prompt and special reports.

Lack of progress should not be relegated to a mere detail on a progress report. Usually certain progress has been planned; therefore, lack of this progress becomes a deviation from approved plans. The quicker this can be detected and reported, the sooner remedial action can be started.

Likewise, mistakes or boners must be considered as deviations which require immediate reporting in order to minimize any serious effects. Your boss can overlook a mistake provided that the same mistake is not made too often and especially if the mistake is reported promptly. If the mistake is ignored or concealed and is then discovered by the boss, he has two legitimate criticisms to make of the employe: (1) original error and (2) the fact that it was overlooked or concealed. This second "mistake" is more serious than the original one. It may not seem easy to admit an error, and it is not easy, but it is a lot less painful than receiving a double reprimand for the boner and for not reporting it.

Anticipated problems . . . Many junior executives and even some higher executives may feel that the reports suggested so far will cover all possible situations in any job. The discussion has already covered the making of either regular or special reports on progress, on completion, and on deviations from approved plans. These three types of subjects do cover all of the work that is normally assigned specifically to an individual.

It must be remembered, however, that whether the job description is specific or whether it is indefinite, it does include for every position the responsibility and authority to make recommendations on any subject which may be of assistance to the company.

The successful businessman must always be thinking in the future. He may want to know what has happened in order to have information to assist future development. This information will help him learn from his mistakes and from the mistakes of others. But the key decisions always look toward the future. It is proper to take time out occasionally to celebrate the accomplishments of the past week, month, or year. But the major interest in a company is not how much money was made last year, but how can the company make money in the current year and in the years to come. As a result, the really valuable executive is one who anticipates the problems which are ahead and who is able to make some suggestions toward their solution.

Today's problems must be solved, but they might not have been so serious today if they had been properly anticipated. Looking ahead may prevent problems, or at least minimize them.

How to Report

You can keep your boss informed through either oral or written reports. An oral report has apparent advantages in not seeming to require much time for preparation, and, apparently, in not taking much time of your superior. These advantages, however, are more apparent than real. An effective oral report should be carefully prepared. If it is not carefully prepared, it may take a considerable period for discussion in order to bring out all of the facts. The real advantage of an oral report is the chance to discuss the problem and to have two-way communication between you and your superior. The principal disadvantages of oral reports are that there is no record of the report, and it is difficult to transmit the report to others.

While a written report seems to take time to prepare and while a good written report does take time to prepare, it has the advantage of providing a permanent record in the files. In addition, it permits referral of the problem to higher authority. Your boss may not have the authority to approve some or all of the recommendations which you make. If the suggestions are in the form of a conversation between you and your superior, he must either write a report himself, or he must pass on your recommendations in another conversation with his superior. The time taken in preparing a good written report is offset by the time saved when your superior has to write only a covering note saying either specifically or in effect, "I concur with these recommendations." Your written report can be easily referred to higher authority and you can be sure that credit will be given where it is due.

On most major problems it is well to combine oral and written reports. This combination can be made by having a conversation with your superior and then preparing a memorandum summarizing the conversation. Again this memorandum can be referred to higher levels in the company. The other combination is to submit a written report to your superior, and follow it up immediately or within a short time with a conversation. The boss may want time to read and consider your report before discussing it with you.

The preparation of reports can be facilitated and the reports themselves can be clarified if you check to make sure that the report clearly answers the following six questions:

1. What is the subject matter of the report? What is the problem?
2. Why is the report being made? Why is this a problem?
3. How can it be solved, or performed?
4. Who is to do it?
5. When is it to be done?
6. Where is it to be done?

The first two questions concerning **what** and **why** should always be first. The question of **why** explains the **what.** The other questions as to how, who, when, and where can be arranged in various sequences, depending upon the specific subject of the report.

Over-all Essentials

If you want to keep your boss informed, you must consider four general essentials:

1. Get all the necessary facts. It is difficult, but not impossible to make a proper decision with only some of the facts. You yourself will be very much embarrassed if you cannot answer the questions that your boss asks in discussing the problem. If you do not know some of the facts, admit it. One of the few things that your boss cannot possibly excuse is a misrepresentation of facts.

2. Distinguish between facts and conclusions. Facts are things that can be seen or observed or measured. Conclusions are interpretations of facts. Most people who believe something think that this belief is a fact. Because of this tendency, they frequently get themselves into difficulty.

3. Submit recommendations. Whenever you are reporting about a present or potential problem, be sure to have a recommendation as to what should be done. You have almost unlimited authority and responsibility to submit suggestions and recommendations.

4. Have an alternative plan. In making your recommendation, either include, or be prepared to submit, an alternative solution. There are very few problems, especially where people are involved, that can be solved in only one way.

THE AUTHOR

Robert D. Gray is professor of economics and industrial relations at California Institute of Technology. A prominent author and lecturer in the field of industrial relations, he has held faculty posts at University of Pennsylvania and University of Connecticut. He has been president and vice president of the California State Personnel Board, and chairman of the board of the Southern California Management Council.

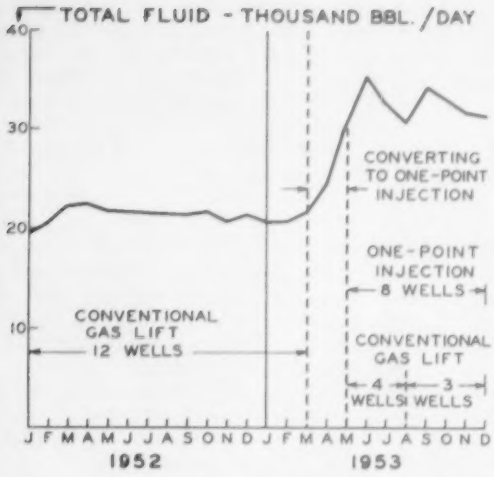

TOTAL FLUID - THOUSAND BBL. / DAY
40
30
20
10
CONVERTING TO ONE-POINT INJECTION
ONE-POINT INJECTION 8 WELLS
CONVENTIONAL GAS LIFT 12 WELLS
CONVENTIONAL GAS LIFT
4 WELLS
3 WELLS
J F M A M J J A S O N D J F M A M J J A S O N D
1952
1953

Fig. 1—An increase of 50 per cent in total fluid production resulted from application of one-point-injection gas lift.

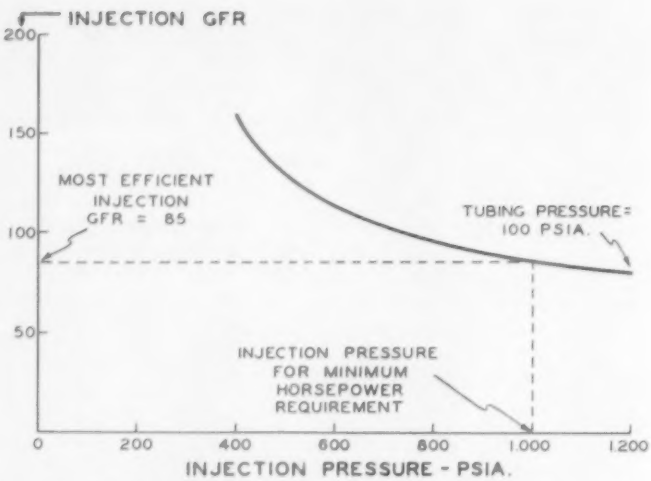


Fig. 3—Using the data from pressure traverses at various gas-fluid ratios, this comparison to injection pressure is made.

One-Point-Injection Gas Lift

. . . yielding more oil in Phillips' Midway field

by F. R. Davis and T. E. Helmly

SHORTLY after the eighth well of Phillips Petroleum Co. in Midway field of San Patricio County, Texas, was put on one-point-injection gas lift, oil production had increased by 32.9 per cent with a corresponding increase in water production of 60.9 per cent.

This increase in fluid production was accomplished by utilizing more efficiently the available horsepower and discharge pressure of existing gas-lift facilities—it was an actual 50.8 per cent increase in over-all efficiency. Fig. 1 is a graph of the daily liquid production from Phillips' Midway field wells for the past 2 years and shows the increased production as a result of the one-point-injection gas-lift program.

In addition to the increased oil production and efficiencies, there are other advantages to one-point-injection gas lift:

1. One point of injection. This simplifies operating conditions for switcher and allows accurate control with surface equipment.

2. Simplified down-hole equipment. Servicing costs and resulting lost production are minimized due to the simplicity and durability of a single down-hole injection device.

3. Simplified down-hole chemical treatment. Since a packer is not required for one-point injection, down-hole chemical treatment is readily attained.

4. Changing point of injection. This can be accomplished by simply raising or lowering the tubing string and the cost is small compared to pulling and rerunning the tubing for respacing and repairing gas-lift valves.

5. Small amount of sand can be produced by one-point-injection gas lift without danger of cutting out down-hole equipment.

Phillips' operations in the Midway field represent the first large-scale field application of the design procedure presented in the paper, "Multiphase Flow of Gas, Oil, and Water Through Vertical Flow Strings."[1] By using this correlation and calculating procedure, it was possible to predict the pressure traverses of both flowing and gas-lift wells. As a result, the amount of injected gas necessary and the injection depth for optimum gas-lift operations could be predicted in advance.

Phillips is presently operating 11 wells, of which 8 are equipped for one-point gas lift. These wells are producing from the main Midway sand and produce an average of 98.5 per cent salt water with water-oil ratios of in-

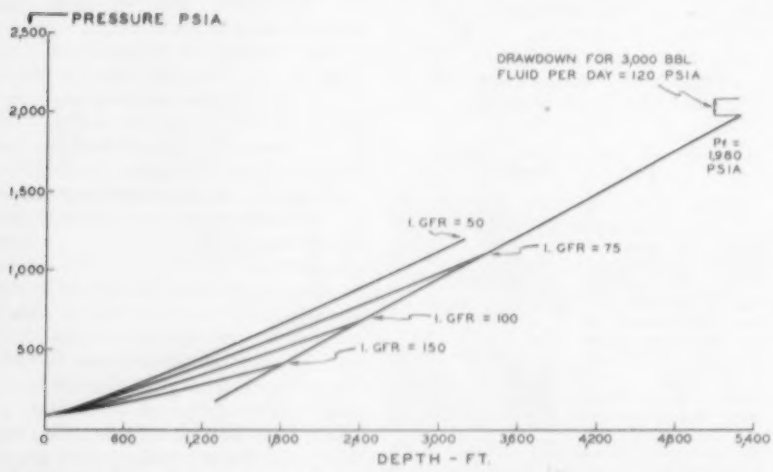


Fig. 2—The pressure traverses above and below the injection point were constructed from the P.I., shut-in bottom-hole pressure, and various assumed gas-fluid ratios.

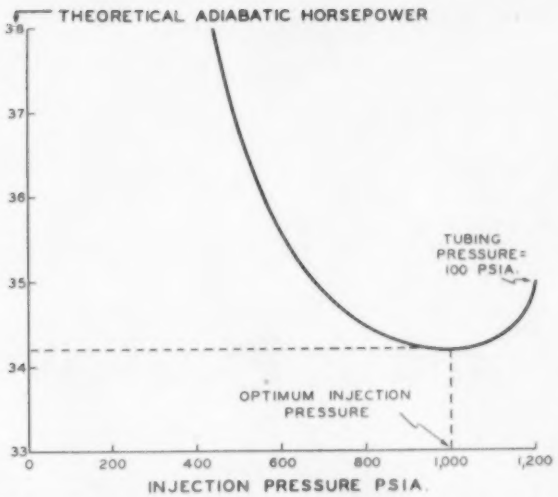


Fig. 4—Computation of the theoretical adiabatic horsepower will show a minimum at the optimum injection pressure.

THE AUTHORS

F. R. DAVIS **T. E. HELMLY**

F. R. Davis, assistant production superintendent for Phillips Petroleum Co. in the Corpus Christi district, joined Phillips in 1948 upon graduation from Oklahoma A. & M. Prior to his present position, Davis was a staff engineer in Corpus Christi and later in the Bartlesville office.

T. E. Helmly, staff engineer for Phillips in the Corpus Christi district, joined Phillips in 1949 upon graduation from University of Texas. He worked in West Texas and eastern Kansas prior to the assignment at Corpus Christi.

dividual wells ranging from 50 to 200. Salt-water disposal is not a problem in this field.

The ability to produce large volumes of fluid in order to obtain the oil, coupled with adequate and economical salt-water-disposal facilities, is necessary for a producer to realize a profit from these operations. This field has a very active water drive, which accounts for the continued large fluid withdrawals with a minimum reservoir pressure drop.

Lift gas for the 11 wells is obtained from a closed rotative compressor system which has a 900-hp. capacity at 60-psi. suction, 840-psi. discharge when delivering approximately 4,600 M.c.f. per day. For the past few years these wells were produced by gas-lift utilizing conventional continuous-flow gas-lift valves. Through the use of Poettmann's work it was determined that increased volumes could be lifted with the same horsepower by more efficiently utilizing the available horsepower.

In April and May of 1953, 8 of the 11 wells were converted to one-point-injection gas lift.

One-point-injection is accomplished by equipping the tubing in a well with a single down-hole injection point so as to allow gas entry into the tubing at only one depth. In Midway field this was accomplished by use of a jet collar with large insert orifices which allowed the input gas to pass into the tubing without appreciable pressure drop. This limits the gas injection to the preselected depth which is as deep as the available pressure permits. As a result, maximum useful work can be obtained from the lift gas.

Design procedure . . . Inasmuch as the closed rotative gas-lift system in Midway field was already installed, the subsurface gas-lift installations were redesigned to increase production through the application of one-point gas injection by utilizing efficiently the available compressor station horsepower and discharge pressure.

Since the wells produce approximately 98 per cent water, design calculations were made on gas-lifting salt water with no consideration being given to formation volume factor, solubility, or formation gas. By designing for only salt water, the calculations were greatly simplified.

For design purposes four of the eight wells were grouped according to productivity indexes, static fluid gradients, and static fluid levels. The following set of conditions was applied to the four wells in designing the subsurface gas-lift installations:

1. Depth of wells = 5,300 ft.
2. Average P.I. of wells = 25 bbl. of liquid per day per psi. drawdown.
3. Shut-in bottom-hole pressure = 2,100 psia.
4. Back pressure on tubing = 100 psia.
5. Specific gravity of water = 1.06.
6. Separator gas gravity = 0.616.
7. Gravity of lift gas = 0.616.
8. Average flowing temperature = 150° F.
9. Tubing size = 3-in. nonupset 7.7 lb. per foot.
10. Production = 3,000 bbl. of fluid per day.
11. Static fluid level = 720 ft.
12. Static fluid gradient = 0.46 psi. per foot.
13. Flowing gradient below point of injection = 0.45 psi. per foot.
14. Available lift pressure at well head = 800 psig.

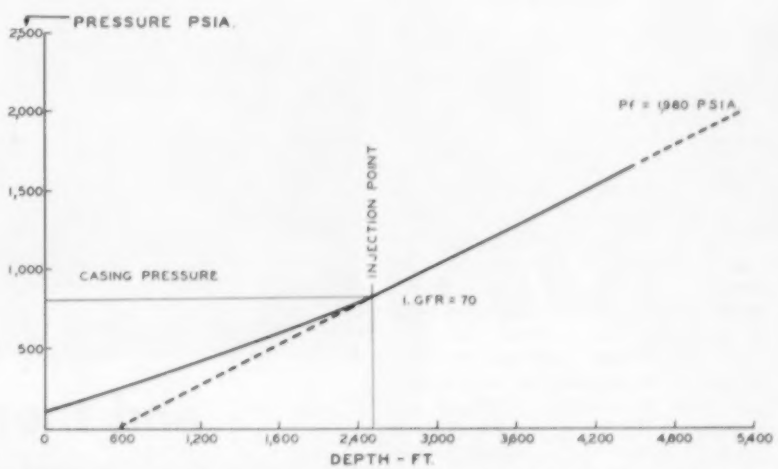


Fig. 5—This actual well traverse was taken in a well gas-lifting 3,142 bbl. per day with an injection pressure of 800 psia.

Using the P.I., shut-in bottom-hole pressure, and flowing gradient below the point of injection the traverse below the point of injection was constructed for 3,000 bbl. of fluid per day. Calculations were conducted to allow the construction of a series of tranverses above the point of injection for various injection gas fluid ratios G.F.R.'s. Fig. 2 represents a plot of the various G.F.R. curves along with the predicted traverse below the point of injection.

Fig. 3 was plotted from data taken from Fig. 2 and is a plot of injection pressure vs. injection G.F.R.

Fig. 4 was plotted from data obtained by computation of the theoretical adiabatic horsepower requirement for various injection pressures and injection G.F.R.'s. From Fig. 4 it can be observed that the minimum horsepower required for 3,000 bbl. fluid per day occurs at an injection pressure of 1,000 psia.

From Fig. 3 it can be observed that the most efficient injection gas fluid ratio for 1,000 psia. injection pressure is 85 cu. ft. per bbl.

From Figs. 3 and 4 it can readily be seen that operation with the available 800-psia. injection pressure would require only 0.3 hp. and 30 M.c.f. per day per well more than would be required for operation under the optimum conditions. Since the available horsepower and discharge pressure at the existing compressor station approached optimum conditions, it was decided to utilize the station in its present form.

Using the static fluid level, static fluid gradient, and available lift pressure, a maximum depth of injection of 2,500 ft. was determined. From Fig. 2 an injection point of 2,500 ft. would require an injection pressure of 720 psia. with an injection G.F.R. of 100 cu. ft. per bbl.

Fig. 5 represents a plot of an actual well traverse obtained while the well was gas-lifting at the rate of 3,142 bbl. of fluid per day with an injection pressure of 800 psia. and a tubing pressure of 120 psia. The actual injection G.F.R. was 70 cu. ft. per bbl. with a flowing gradient below the point of injection of 0.43 psi. per foot.

If the flowing traverse below the point of injection in Fig. 2 had been plotted for a 0.43 gradient instead of a 0.45 gradient, the traverse would be shifted to the left and up due to the lighter flowing gradient below the point of injection. The 2,500-ft. injection point would then intersect the new traverse at the injection pressure of 820 psia. with an injection G.F.R. of approximately 70 cu. ft. per bbl. Thus it can be seen that the predicted traverse corresponds closely to the actual traverse.

The subsurface gas-lift installations for the remaining four wells were designed in a similar manner; however, because these wells exhibited much larger productivity indexes, they were designed on an individual well basis. All four of the wells are on one-point gas-lift with two of the wells being produced through 4-in. tubing while the remaining two wells are being produced on annular flow. The fluid volumes from these wells range from 4,000 to 6,000 bbl. per day with injection G.F.R.'s ranging from 70 to 128 cu. ft. per bbl.

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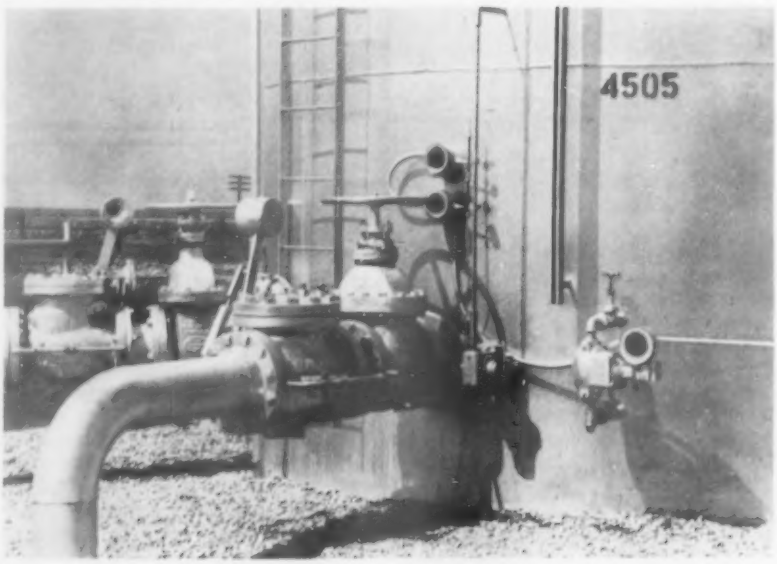
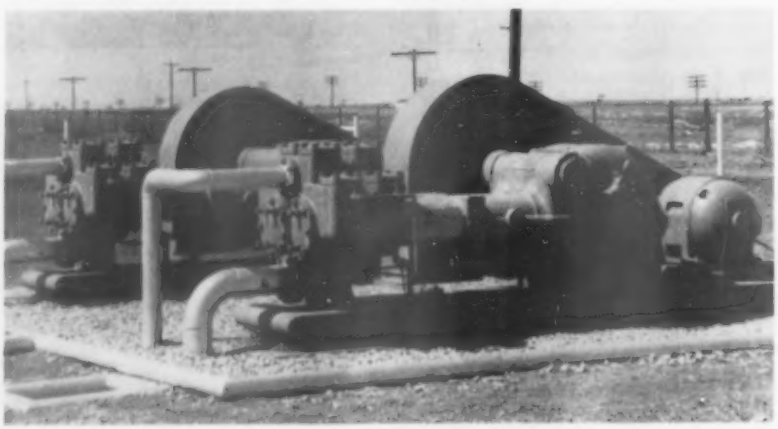
1. Poettmann, F. H., and Carpenter, P. G., "The Multiphase Flow of Gas, Oil, and Water Through Vertical Flow Strings." Presented at A.P.I. spring meeting of Mid-Continent district, March 1952.

Automatic Pipeline . . .

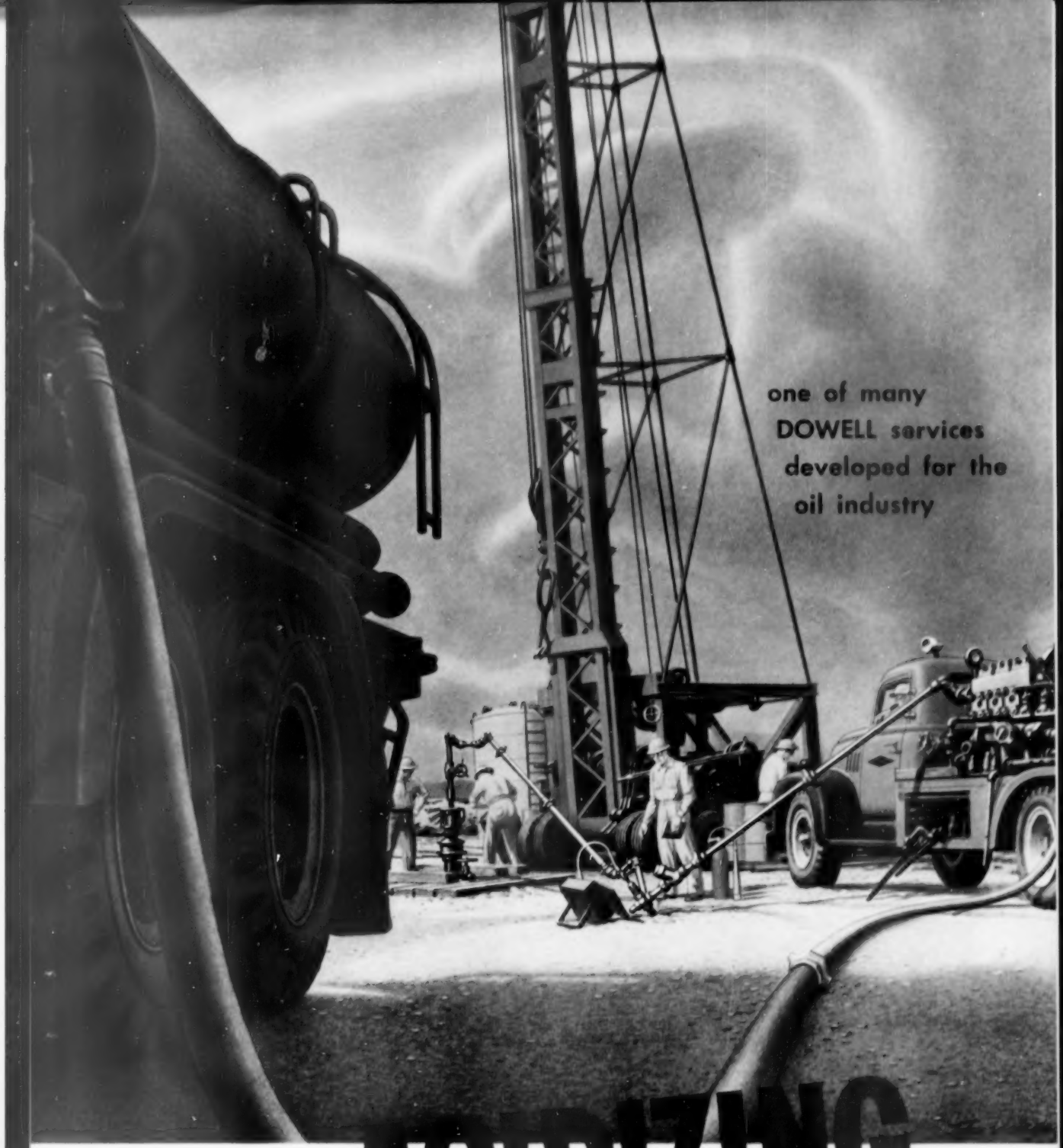


. . . these are the valves and tank



. . . and these are the pumps

This is part of the Texas-New Mexico Pipeline Co. installation in South Lovington field, Lea County, New Mexico.



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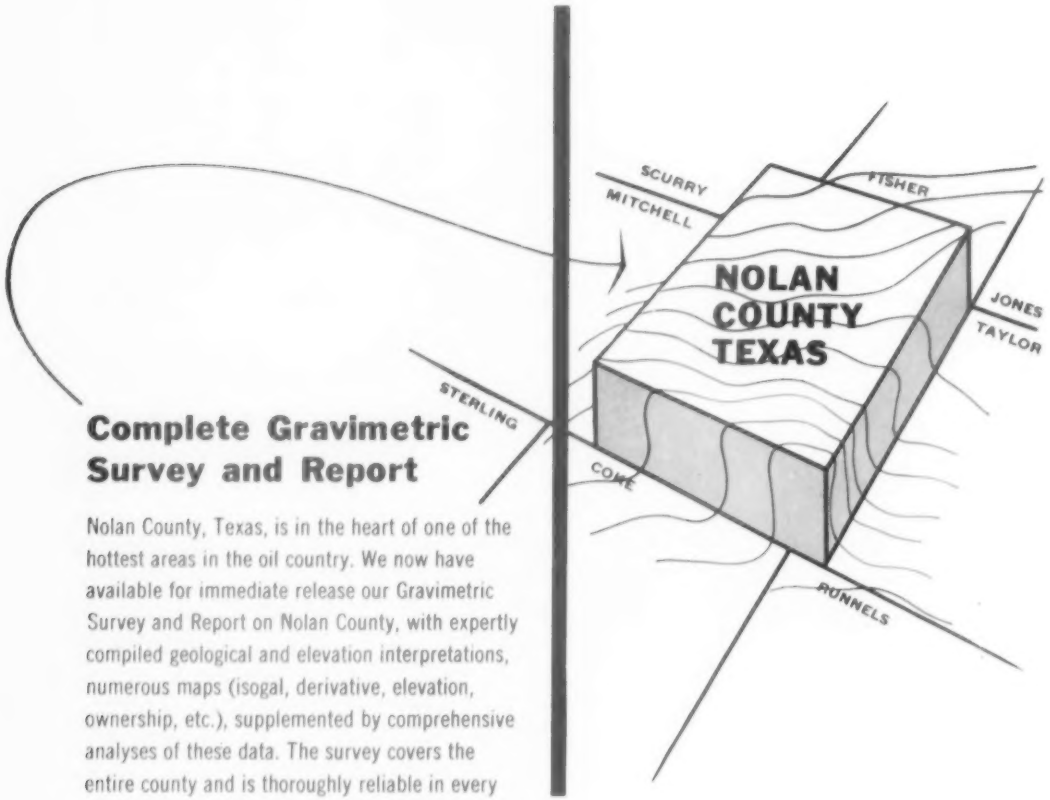

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LIGHT ROTARY RIGS do almost all Pine Island drilling. This rig is owned by McDowell & Cook, contractors, of Vivian, La., and is on a Magnolia Petroleum Co. lease.

Turnkey Drilling Contracts Feature Pine Island, Louisiana, Play

by Ed McGhee
Drilling-Production Editor

ALMOST one-third of the wells drilled this year in Louisiana are in shallow Pine Island field of Caddo Parish in the northwestern corner of the state. New locations are being spotted at rates as high as 30 per week; and since January 1, total wells completed in the Annona chalk formation of the field number in excess of 600.

A large number of these wells are being drilled on a turnkey basis rather than on a footage or day-work basis. No permanent well equipment is furnished by the contractor on these jobs, but day time is paid for lost circulation time in excess of 12 hours. Waiting time of third parties (service companies, etc.) is the only other exception to these contracts providing a flat sum payment for drilling the well.

Operating companies who let these turnkey contracts claim it gives them a cheaper hole. They do not find it necessary to keep a representative on the location at all times as is often the case on footage or day-work wells. Moreover, the bids are often reported to be lower than when submitted on a straight footage basis.

Contractors say they like the arrangement because there is a better delineation of authority and responsibility.

Turnkey wells drilled approximately 1,600 ft. to the Annona chalk have been at prices ranging from $2,400 to $3,000. In some instances, Pine Island wells have been drilled, completed with material furnished, and delivered on production to the operator for approximately $12,000. However, this completely turnkey job is not common practice.

For North Louisiana, turnkey drilling is not a new procedure. On shallow (around 4,000 ft.) wells in the Cotton Valley area, some smaller independents have let contracts which provide for the contractor not only to drill and complete the well, but also to perform such miscellaneous services as settling with the landowner after the rig has moved off.

Keeping prices low . . . Because many of the Pine Island wells never achieve production rates in excess of 10 bbl. of oil per day, many money-saving drilling methods are practiced. One of these is the elimination of surface casing in a large number of the wells. Some operators continue to set 60 to 100 ft. of surface pipe, but others are finding it advantageous to cement the oil string to the surface. Thus cost of surface casing is eliminated, and waiting-on-cement time is avoided.

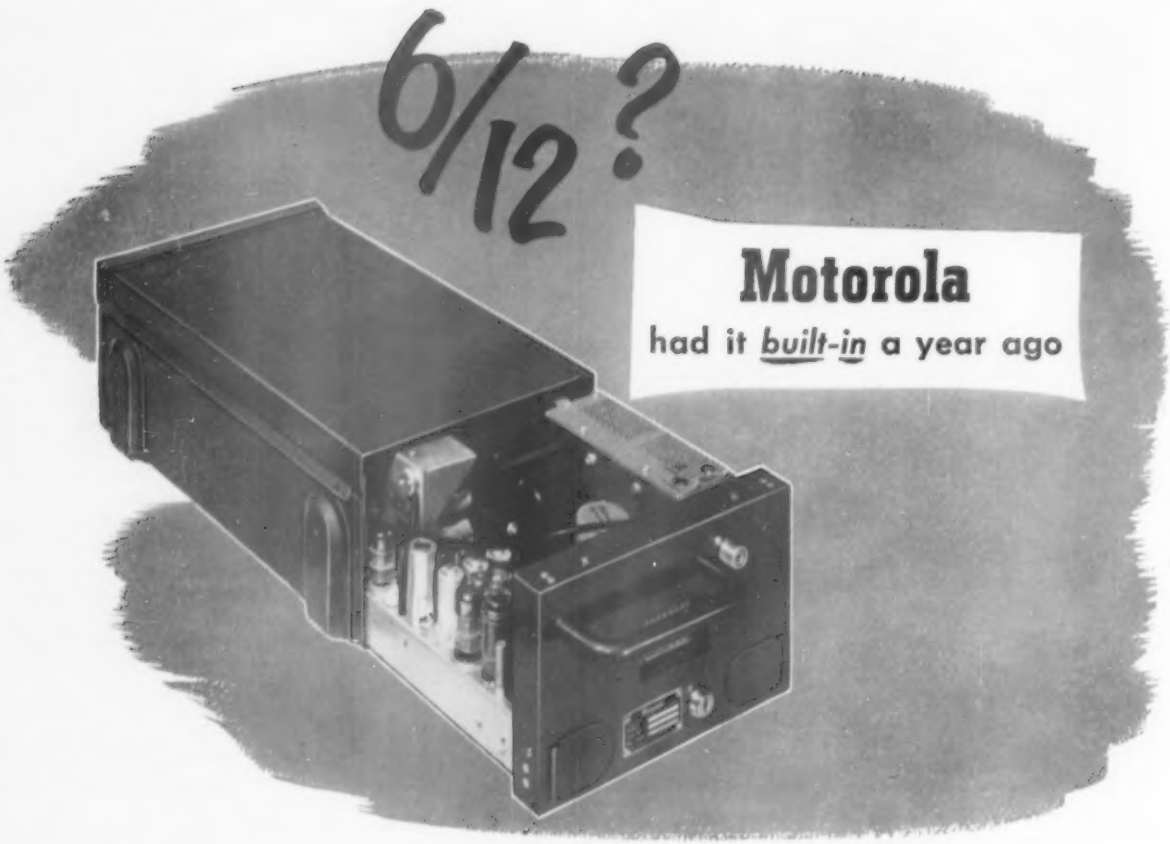
Another important saving is made by using small-diameter pipe for the oil string. Some 5½-in. pipe is set, but 4½-in. o.d. pipe is considered almost standard. The saving is twofold. Besides the saving in purchase price of smaller pipe, smaller hole can be drilled with a less expensive bit.

It has also been found that time can be saved by running the oil string without first running an electric log. During the waiting-on-cement time, a gamma-ray log may be run to determine perforating intervals.

Some operators, in preparing Pine Island locations, merely set an upright oil drum in the absence of surface pipe, to serve as the casing head while drilling is under way. With the ends removed, the drum directs the return mud stream from the time of initial spud in until reaching total depth. However, others are even foregoing this formality, and are using a little shovel work to form a ditch.

Fracturing required . . . All Pine Island wells require hydraulic fracturing before producing. Most treatments are multiple-zone jobs, with three separate treatments of 30,000 gal. each being common. In some cases, as many as four or five individual intervals of the chalk have been treated in a single well.

One bit will drill the average Pine Island well to total depth, and usually less than 48 hours are required from spud in to cementing the oil string. Completion work varies with the different operators, and the contractor may be required to remain on location after drilling out the plug on the oil string. As a result, the rig may be on the well from 3 to 5 days.



A growing number of automobile manufacturers are changing from 6 to 12 volt electrical systems. Motorola 2-way radio now gives you built-in protection against expensive obsolescence should any part of your fleet be affected by this trend.

WHAT IT IS — It's truly universal 6/12V equipment—2-way radio that can be interchanged in mixed 6 and 12-volt fleets without modification of power supplies, jumpers, plugs, connectors, cables or switches. When re-installing in a 12-volt car, no cable replacement is required. It is so foolproof that you can safely make changeovers in the dark without worry of burning out tubes or damaging a power supply.

FEATURES—The *all-vibrator* power supply attains over 70% power conversion efficiency with a resultant power drain reduction of up to 40%—for more power per unit size per ampere drain than any other sets on the market—all this, plus the superior performance of Motorola's famous Sensicon with guaranteed permanent selectivity and seven other exclusive features.

ACCEPTANCE—Again anticipating the trends, Motorola offers freedom from obsolescence, and superior performance at lower cost. You can easily see and hear the difference—greater signal strength, more audio power, longer battery and generator life, lower maintenance costs. You get all this in Motorola's truly universal 6/12-volt mobile units—available in the following classes:

- 25-54 mc., 25-30 and 50-60 watts R.F. output
- 144-174 mc., 10 and 25 watts R.F. output
- 450-470 mc., 18-20 watt R.F. output

Here is a partial list of Motorola customers who have 6/12 volt interchangeable mobile units—

Michigan State Police	Community Public Service Co.	Florida State Police
Ohio State Police	County of Orange, Calif.	Iowa State Police
Boston Edison Co.	El Paso National Gas Co.	State of South Carolina

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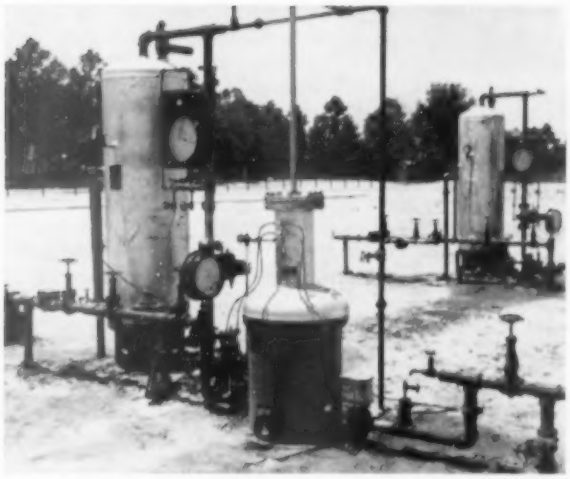
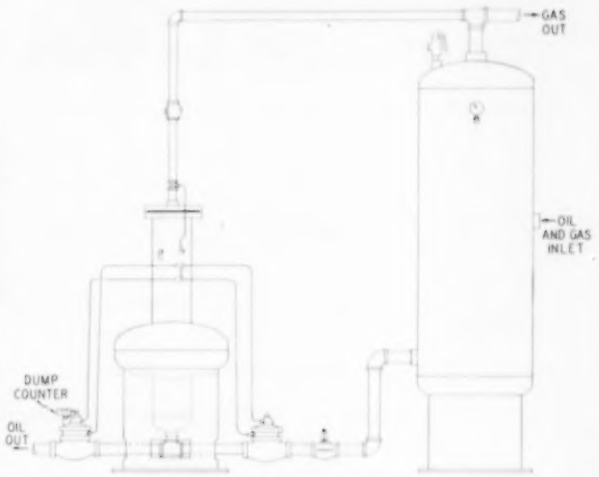


TYPICAL FIELD INSTALLATION of new meter designed to measure production at the lease separator.



DETAILS OF INSTALLATION of meter when adapted to a vertical separator on the field lease.

New Meter Measures Crude at Separator

Also . . .

- **Operates as liquid-level controller for separator**
- **Serves as automatic water meter and knockout**

by F. L. Resen
Gulf Coast District Editor

FIELD tests have been satisfactorily run on a newly developed crude-oil meter designed to measure oil-well production at the gas-oil separator on the field lease.

In actual tests with a major Gulf Coast oil operator and a large-scale independent operator, it functioned with a high degree of accuracy. The meter operated to measure liquid volume with a minimum of variance from calibrated measurements.

Additionally, the instrument operates as the liquid-level controller for the separator, is unaffected by gas—which is actually needed in its operation—and will function with an abnormally high amount of foreign matter present. With modifications, it may be used as an automatic water meter and knockout.

How it works . . . The meter is relatively simple in its construction, consisting of two dish-shaped heads welded together to form a volume chamber, with narrow vertical extensions below and above the chamber. A spherical float, riding on a vertical guide rod, moves within the chamber according to its liquid content. This float serves to actuate controlling mechanisms governing the flow of liquid in and out of the meter.

The unit is connected downstream of the gas-oil separator, and receives liquid by gravity flow from the separator through a diaphragm snap-acting valve. As the liquid enters the lower volume chamber extension, it causes the float to rise until it reaches a stop collar located in the upper extension of the chamber. This causes a pilot mechanism to actuate the inlet and outlet valves, causing the former to close and the latter to open. Both of these valves are of the same type, with gas inlet and bleed lines connected so that positive action will be effected.

The upper section of the volume chamber is connected to the separator gas line and gas pressure in the meter forces the liquid out of the meter and into the gathering line. As the float drops down with the liquid, it touches a stop collar located in the bottom extension, which actuates the pilot mechanism again, and the valve positions are reversed so that the meter can again receive oil for the next measurement cycle. Meanwhile, the unit volume of the meter has been registered on a counter attached to the outlet valve. This counter is operated by the valve stem each time the outlet valve opens, indicating one more unit has entered the gathering line. The pumper merely notes the counter reading, compares it with the previous reading, and then multiplies it with the unit volume—½ bbl., 1 bbl., 5 bbl., etc.—to obtain the amount of oil which entered the gathering system.

Accuracy . . . It may be noted that the accuracy of the meter is attributed to the extensions to the volume chamber which permit the same amount of liquid to be dumped each time the meter functions. These extensions are similar to those used on the standard weights and measures cans for calibrating service station gasoline pumps. Thus, by carefully positioning the float, the meter dumps a calibrated amount of liquid each time the upper stop is reached.

Installation of the unit may be made on both horizontal and vertical separators or a heater-treater, with the only difference being the piping layout and the vertical positioning of the meter. Since the meter acts as the liquid-level controller on the separator, it is necessary that the upper stop be on a

level with the fluid level desired in the separator. As the liquid level equalizes between the two vessels, the float will act to dump the meter and this, in turn, will maintain the separator level.

The unit is capable of operating when there is an inordinate amount of foreign matter in the well stream, since the same point at the bottom of the meter is used for inlet and outlet. This permits the oil to flow out of the meter to keep the lines flushed of sand and other particles. With no working parts to become scored, the effect of these materials is limited to the valve seats of the dump valves.

At the same time, gas has no effect on the workings of the meter and does not adversely affect its component parts. Should the meter be installed on a well with a limited amount of gas—less than 15,000 cu. ft. per day—or with pressure below that of the gathering system, an outside source may be brought into the meter to force the oil out and to operate the diaphragm valves.

Capacity of the meters may be varied to fit any well along with the required working pressure. A controlling factor will be the size of the inlet and outlet valves, with a flow of 1,440 bbl. per day being possible with a 10-lb. differential between the separator and the flow line. The same flow rate can be achieved through 2-in. valves with 5-lb. differential and the flow can be upped to about 2,200 bbl. per day, with a 10-lb. differential and these valves.

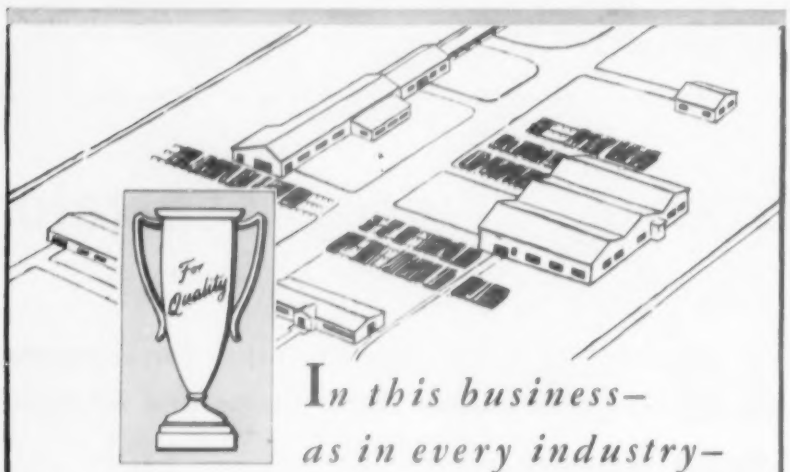
However, no matter what the well output, no minimum rate is necessary to operate the meter. It will dump and register each time the volume chamber level causes the float to rise and actuate the pilot mechanism. This could be a matter of days on stripper wells and still the accuracy or efficiency would not be impaired.

Water knockout . . . With some slight modifications, the meter can be used to knock out water and at the same time measure the amount. Initially, the float would be changed to one with the proper specific gravity to sink in oil and float in water. The fittings would be altered so that water would enter the volume chamber, rather than the oil. Likewise the vertical positioning of the meter would be such that the upper stop would be on a level with the water level in the separator. Otherwise, the meter will operate as before. Any oil carried over will pass back into the separator through the inlet line, for it would have no effect on the float's action and water entering the volume chamber will displace the oil.

A specially designed metering separator has been constructed in the development of the meters, which is a horizontal unit incorporating both an oil meter and a water meter in its body. The upper vertical necks of the meters extend within the internal portion of the separator, and are open so that separator gas pressure can be used to force liquids out of the meters. The pilot mechanisms are also within the separator proper, with an elliptical manhole provided to serve the unit.

The position of the upper stops on the meters vary, with the water meter having its stop quite low and the oil meter having its stop relatively high, so respective fluid levels may be maintained. Water enters its meter through fittings in the bottom of the separator, while oil enters through a riser extending above the water level. Again, in case of a surge, oil will be expelled from the water meter and have no effect upon its operation, due to the specific gravity of the float.

The meters are a development of Rolo Manufacturing Co., Houston, and have been termed Rolocheck meters.



In this business— as in every industry— leadership depends on quality of product.

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Fluid Displacement in Linear Floods—5

by Dr. R. F. Nielsen

IF an artificial water flood is started in a field depleted by solution-gas drive, there will be oil, gas, and connate water present in the formation before the flood is started. Under most conditions, the oil will "bank up" ahead of the injected water. Some gas will be driven ahead of the flood, some will be dissolved by the increased pressure, and some may only be more or less compressed.

In estimating saturation distributions behind the bank, as it moves out from an injection well, one would probably assume zero gas saturation at the front. The fractional flow of water, neglecting capillarity, is, as before:

$$f_w = [1 + (k_o\mu_w/k_w\mu_o)]^{-1} = F \quad (1)$$

The saturation just behind the oil bank would, according to theory, be given by the point of tangency of a line from F = 0, S = connate-water saturation, to the F—S_w curve.

The Buckley-Leverett frontal-advance formula must be modified slightly for radial flow. The continuity equation for plane radial flow is:

$$\frac{\partial S}{\partial t} = \frac{-Q}{2\pi r\phi}\,\frac{\partial f}{\partial r} \quad (2)$$

Q is injection rate per centimeter thickness, f and S refer to the water phase, and ϕ is porosity.

The frontal-advance formula then becomes:

$$\pi\phi\Delta(r^2) = Q\Delta t\,(df/dS) \quad (3)$$

where the saturation to which df/dS refers is at position r. The saturation distribution behind the front is, accordingly, found by plotting dF/dS against water saturation, from that at the front to that at which F = 1.

Author is associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

The dF/dS scale is converted to a linear scale of r^2, in accordance with known distances to which the front has traveled.

If the effective shot-well radius is 15 ft., and the water has moved out 50 ft., then the zero of dF/dS is called 225, and the value of dF/dS at the front saturation is called 2,500. Values of r^2 are evenly spaced between these points.

With inward radial flow . . . Fig. 1 shows a theoretical saturation distribution for radial flow inward, such as has often been used in flood pot recovery tests. In this case, the square of the outer radius corresponds to dF/dS = 0. To obtain a saturation distribution for a later time, including any time after breakthrough, the curve is "stretched"; that is, each point is moved to the right so that the ratio of its new to its present abscissa is equal to the ratio of the total input at the new time to the present input. The same scales are retained on the axes.

According to Equation 3, df/dS is the reciprocal of the quantity of water injected, in pore volumes, if $\Delta(r^2) = r_2^2 - r_1^2$, r_1 is the injection-well radius (or outer boundary for inward flow) and r_2 designates the location of the front. It follows that, just as for linear flow, the average water saturation behind the front is given by the intercept at F = 1 of the tangent to F at the frontal saturation.

Thus oil production at water breakthrough should be the same for linear flow, inward radial flow, and outward radial flow if the fluids, porous medium, and initial saturations are the same, and if capillarity and "end effects" are negligible.

The use of the above theories in a field secondary-recovery operation is complicated by a number of factors. The portion of the oil bank pushed into relatively dead areas at water breakthrough is difficult to estimate. Oil-water viscosity ratio not only affects the value of f in the equations given, but also the shape of the oil-water interface as it nears the producing well.

High oil-water viscosity ratio will cause the water to break through the cusp at an early stage. Finally, if the formation is made up of layers of greatly varying permeabilities with limited vertical communication, production history will be largely governed by this factor.

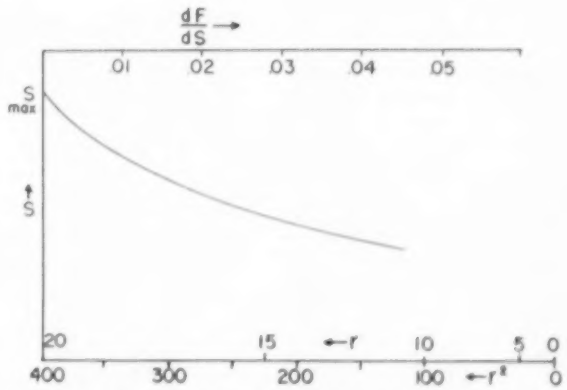


Fig. 1—Calculation of saturation distribution behind the front in radial water drive under idealized conditions.

ELECTRIC LOGGING — 37

Measuring Spontaneous Potential in Limestone

by R. I. Martin

BECAUSE the resistivity curves described in the previous two installments were in use for a long time, and the two electrode normal and limestone device are still used, it is convenient to consider the corresponding S. P. effects at this stage.

The permeable zones, whether oil bearing or water bearing, are somewhat conductive because of the connate water. Impermeable zones, such as shales, are also relatively conductive. When they are thick and sufficiently conductive, the S. P. log approaches the static S. P. diagram.

When, however, the conductive beds are thin and are separated by thick formations of high resistivity, the S.P. log has a shape which is quite different. This results from the fact that the resistive formations tend to prevent the S.P. currents from entering or leaving the hole. The S.P. currents have to flow into, or out of, the hole almost entirely by way of the conductive beds. As a result, the peaks corresponding to permeable zones spread above and below in a manner which is apparently abnormal.

Fig. 1 shows a typical case of limestone with permeable layers, and shale beds. The resistivities of the various beds are shown. The static S.P. diagram and the S.P. log are also shown. It is readily seen that the two show marked divergences.

In this example, it is assumed that the static S.P. in front of the hard formation is the same as that in front of the shales. Any other reasonable value could have been used without affecting the S.P. log unduly. This is because the hard formations are much too resistive to allow any appreciable S.P. current to diverge into the mud and thereby to influence the potential. What happens when the hard formation is less resistive will be considered later.

Author is assistant professor of petroleum engineering, Missouri School of Mines and Metallurgy.

How S.P. currents flow . . . The shape of the S.P. log is best followed by considering the circulation of the S.P. currents. This circulation is shown in a qualitative way in the right-hand illustration.

The S.P. currents flow into the permeable layers. They cannot traverse the adjacent hard formations through sections located close to the bore hole because these sections, small in area, offer too much resistance. Accordingly, the S.P. currents penetrate deeper than usual and enter the hard formation through large cross-sectional areas.

From there on it is easier for the S.P. currents to continue their path in the hard formation through a large volume of rock. They do not converge back to the bore hole, but continue to flow at depth toward conductive beds. They cannot return to the bore hole by other permeable beds because they will encounter opposed e.m.f.'s. When the first conductive beds encountered are permeable, the currents flow across them until they reach a shale. This is shown in the lower part of the right-hand illustration.

Equivalent circuit used . . . The resistance network is an equivalent circuit, and has been used to determine the shape of the curves experimentally by measuring potentials occurring at various points. Each permeable bed is represented by an e.m.f. of 100 mv. and a resistance which is the one which the S.P. currents encounter in the bed and in the surrounding hard formation before the current path has expanded to a sufficiently large cross section at a great distance from the bore hole for the resistance to be considered negligible. This formation at a large distance from the hole is represented by the conductor i j k l m n, which is supposed to have no resistance.

The mud column is represented by resistances which have a constant value per foot of hole. In this case it is 10 ohms per ft.

The shales are represented by conductors of negligible resistance, because they are so thick that they offer little resistance to the flow of the S.P. current. No e.m.f. is shown for the shales because it has been assumed, for convenience, that all the e.m.f. is generated in the permeable beds. Whether this is true or not, the resulting potential changes in the mud column will not be affected.

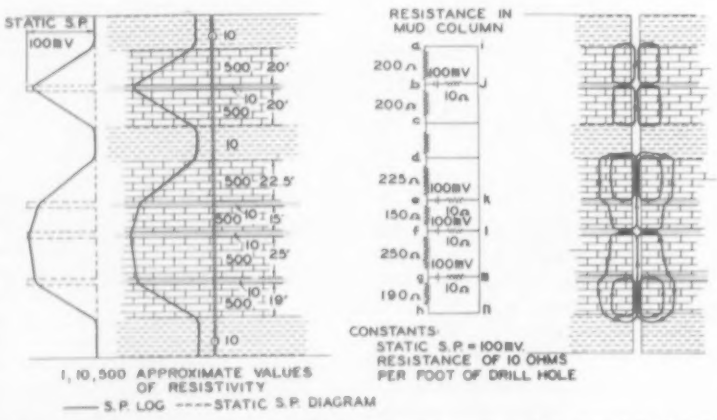


Fig. 1—Measuring spontaneous potential in resistant formations. The static S.P. diagram and the S.P. log show marked divergencies.

CENTRIFUGAL COMPRESSORS:

How Gas Constants Enter Into Design and Performance—4

by Sherman L. Cole

IT has previously been stated that, theoretically, a given centrifugal compressor will develop the same head regardless of the characteristics of the gas it is handling or the operating conditions. This holds very nearly true for single-stage compressors; but it is not strictly true for multistage units, although it does serve as a means of approximating performance at conditions not too far removed from design values.

Multistage compressors . . . In a single-stage machine we are dealing with only one impeller, and the effect of changed gas characteristics and operating conditions do not have an opportunity to manifest any great deviation from the theoretical calculations. However, in a multistage compressor the performance of any one impeller is, to a large extent, dependent upon the performance of the impeller preceding it. For example, let's discuss the curves in Fig. 4.

A typical five-stage compressor might have a performance curve represented by the heavy line. However, this is actually "built up" by superimposing five individual performance curves for five different impellers on top of each other. These are represented by lighter lines and each stage has been indicated. It can be seen that the performance curve of the complete machine is actually the performance curve of the fifth stage when operating in conjunction with the other stages, each stage being governed by the impeller ahead of it. Each impeller, although all are sized for the 100 per cent capacity point, is narrower than the one preceding it. This is to account for decrease in specific volume (increased density) as the gas passes through the machine.

Author is engineer with Ingersoll-Rand Co., Phillipsburg, N. J., turbo-blower department.

Also, bear in mind that an impeller is only sensitive to the number of cubic feet per minute passing through it, not pounds or moles or standard cubic feet per minute.

Capacity-head shift . . . At design conditions, all wheels will operate at points represented by the vertical solid line at 100 per cent. Assume an increase in density or rate of change of density (increased molecular weight, decreased supercompressibility factors, increased specific gravity or decreased "K" value), the stages after the first, instead of operating at 100 per cent capacity, will be at less than 100 per cent points represented by the X's. Total developed head would be at level X—X.

Conversely, if density decreases or rate of change of density decreases (decreased molecular weight, increased supercompressibility factors, decreased specific gravity or increased "K" value), the stages after the first, instead of operating at 100 per cent capacity, will be at greater than 100 per cent points represented by the O's. Total developed head would be at level O—O.

It is obvious that for conditions other than design and with rated volume going through the blower intake flange, a compressor will not develop exactly the rated head but something more or less, depending upon the variations from design conditions and the particular machine in question.

In summation, it must be stated that centrifugal-compressor manufacturers cannot design and build units without accurate knowledge of the characteristics of the gas to be handled. These important gas constants are molecular weight, supercompressibility factors, "K" value and specific gravity. One of the biggest contributions a purchaser can make toward assuring receipt of a machine that will satisfactorily do his job is to insure that the turbocompressor is designed for the correct factors.

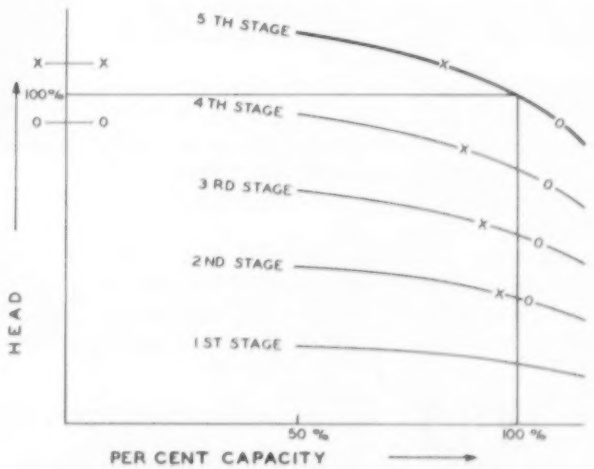
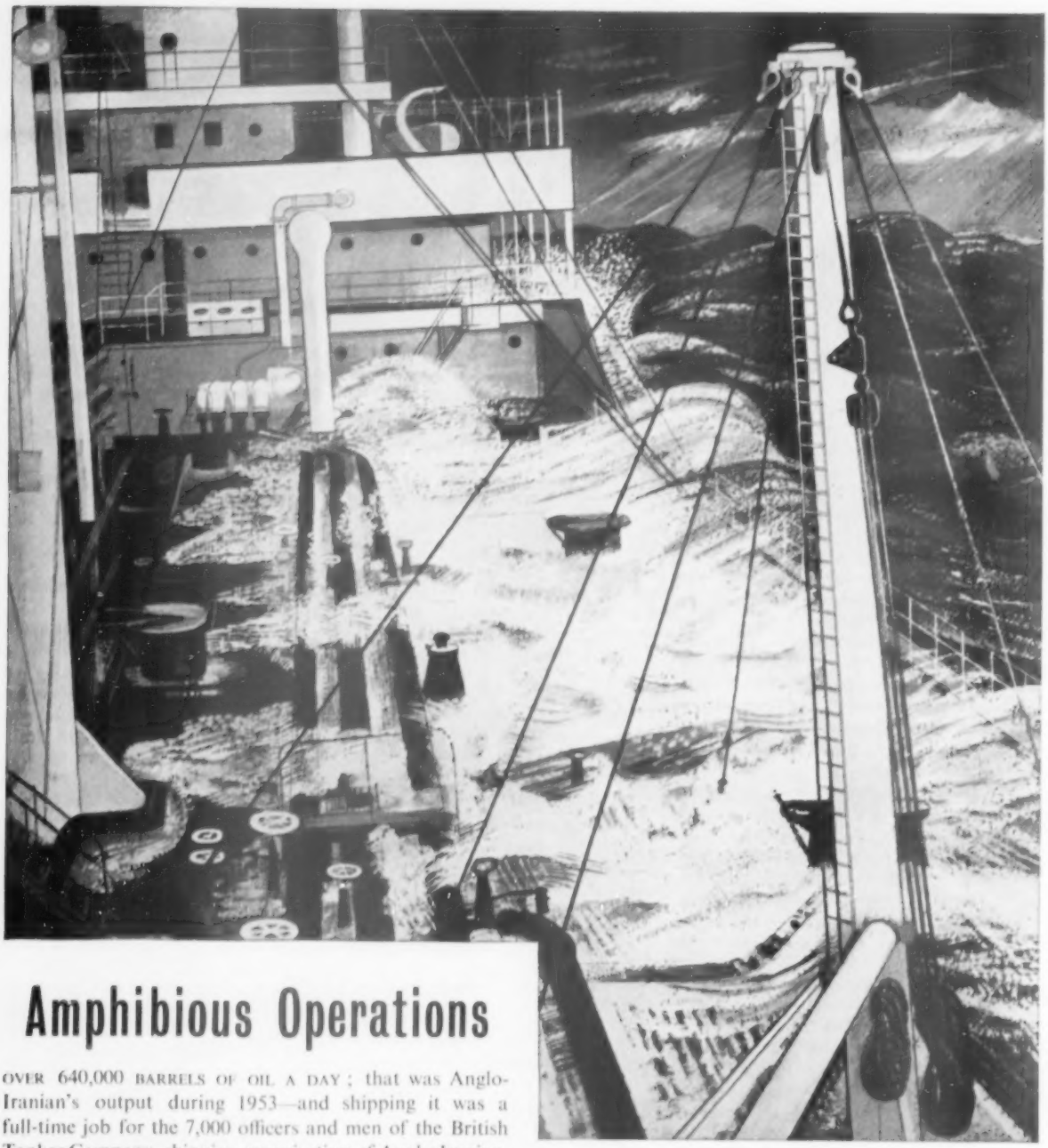


Fig. 4—Showing head-capacity shift in multistage centrifugal compressor due to change in gas constants.



Amphibious Operations

OVER 640,000 BARRELS OF OIL A DAY; that was Anglo-Iranian's output during 1953—and shipping it was a full-time job for the 7,000 officers and men of the British Tanker Company, shipping organisation of Anglo-Iranian. These men operate one of the world's largest privately-owned fleets.

While the ships of this fleet crossed and re-crossed the world, Anglo-Iranian prospectors were searching for more oil in desert lands, tropical jungles, and beneath the seabed itself. In the Middle East at Aden, and at Kwinana in Australia, two important new refineries were building, to join the twelve others already in operation in seven different countries.

From the earth's natural wealth, Anglo-Iranian is helping to fashion a new prosperity for the peoples of the world.

THE BP SHIELD IS THE SYMBOL OF THE WORLD-WIDE ORGANISATION OF

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LIMITED

Separation of Natural-Gas Liquids — 5

by John M. Campbell

In the preceding installment, two gas analyses with different ratios of propane to hexane-plus fractions were used to illustrate the effect of gas analysis on separation. Discussion continues with respect to residue-gas liquid content for analyses "A" and "B," gas shrinkage, and residue-gas heating value.

A SUMMARY of the butane-plus content of the residue gas is shown in Fig. 8. Some lines require that this shall not exceed 0.4 gal. per 1,000 cu. ft., in which case a 0° F. temperature would be required in all cases. As might be expected, the content increases with separation temperature and as the well stream becomes leaner. For very lean streams, processing means other than separation would be required to meet the above specification.

Author is manager of process equipment department, oil and gas division, Black, Sivalls & Bryson, Inc., Oklahoma City. Paper presented at Ninth Annual Short Course on Gas Technology, Texas A. & I. College, June 1954.

Gas shrinkage . . . Fig. 9 illustrates the gas shrinkage to be expected on separation. The greater shrinkage at 900 psi. confirms the higher liquid recovery at that pressure. The flatter slope for the rich gas also confirms that more liquid is formed at higher temperatures and that the need for low-temperature separation is less acute. If the percentage of heavy ends were greater, the slope would decrease correspondingly.

As the temperature is lowered, at a given pressure, the lines converge because the total propane-plus content in the two analyses is the same and this effect shows up at the lower temperatures. Therefore, at lower temperatures, gallons per 1,000 cu. ft. becomes a more important factor.

Residue-gas heating value . . . Fig. 10 gives the variation of gross heating value with separation temperature and pressure. As might be expected, the lines have the same general characteristics as those in Fig. 9. Gas A has the lower heating value at given conditions which confirms previous results. Therefore, for a given allowable heating value, the necessary separation temperature increases with increasing heavy ends and separation pressure. At some higher pressure than those considered, however, increase in pressure would increase heating value.

These curves also show that minimum heating values may be met with low-temperature separation in the absence of large quantities of inert gas.

A sample calculation will be presented in the next and final installment of this series for gas A (see analysis in Table 2, Installment No. 4). Optimum temperature for maximum revenue will be found. The payout and gross yearly revenue after payout will be determined for these three cases: (1) use of expansion refrigeration without hydrate inhibitor (2) use of glycol injection and (3) use of separators, choke and heater. Each of these cases will be considered in connection with (A) 3-stage separation, (B) stabilization.

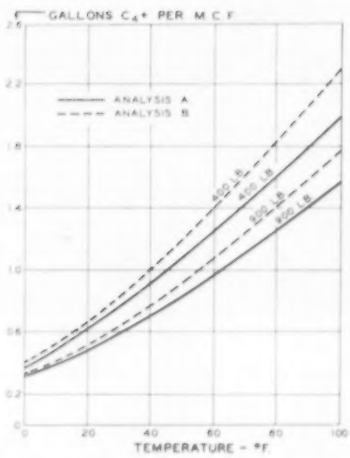

Fig. 8—Butane-plus content of residue gas from separator.

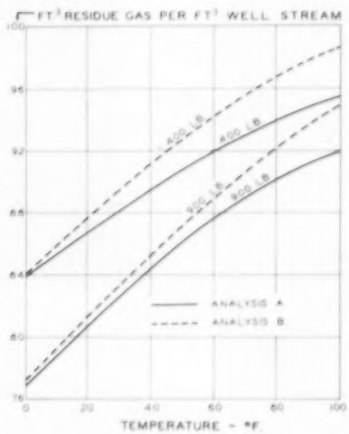

Fig. 9—Ratio of residue gas to well stream gas entering separator.

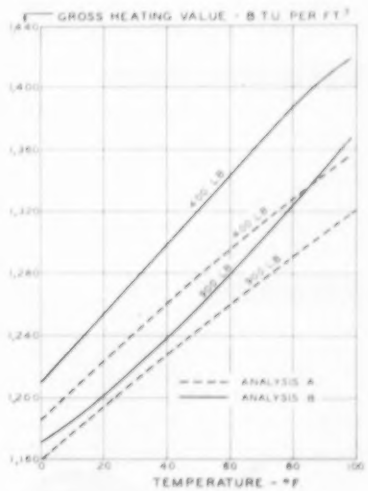

Fig. 10—Gross heating value of residue gas.

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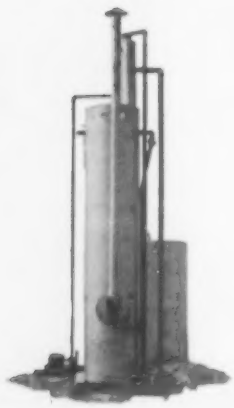

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DUNHAM TANKS

DIVISION OF ANDERSON-DUNHAM, INC., BATON ROUGE, LA.

by W. L. Nelson
Technical Editor

Where to Use Aluminum Alloys

SOME of the services that have been successfully handled with aluminum alloys are indicated in Table I herein. There are, in addition, certain general properties that are somewhat unusual to aluminum alloys. Aluminum is not actively attacked by moisture to form a rust and hence tanks, ladders, walkways, weatherproofing, portable platforms, etc., usually do not need to be painted. Its light weight and relatively great stiffness for its weight, are also useful properties for such equipments as drum skids, portable ladders or scaffolds, dock plates, truck tanks, fuel tanks, containers, drums, cylinders, etc. The nonsparking behavior of the aluminum alloys is also useful.

Aluminum alloys are not recommended for temperatures above 400° F. (strength is 80-85 per cent at even 200° F.), but a few installations (bubble caps) have operated successfully at even 625° F. At low temperatures, the physical properties of most aluminum are enhanced (Petroleum, Dec. 1952, p. 328) and certain aluminum alloys are outstanding for extremely low temperature services such as the liquefaction of oxygen or gases:

Temp. (°F.)	Tensile strength* (psi.)	Yield strength (psi.)	Elongation* per cent
75	16,000	6,000	40
0	17,000	6,000	41
—112	19,500	7,000	42
—320	33,000	8,500	46

*Round specimens with gage length four times the diameter.

TABLE I—SERVICES IN WHICH ALUMINUM ALLOYS HAVE BEEN USED OR ARE BEING PROPOSED

Equipment, service or material handled—	Alloy or equipment
Acetic acid*	Tank cars
Alcohols—all varieties*	Generally, tank cars, etc.
Ammonia*	Condensers and coolers
Ammonia and sulfide solutions (catalytic cracking overhead)*	Condensers and coolers
Ammonium nitrate and its solutions*	Tank cars and general
Amyl mercaptan*	General
Brackish water	Alclad 3S tubes
Bubble caps—sour stocks (200°-625° F.)	Silicon-bearing alloy casting, also wrought
Cable and conduit—sulfide atmospheres*	
Carbon dioxide gas and solutions*	General
Coke (calcium chloride treated)*	Chutes, hoppers and truck bodies
Compressor aftercoolers or intercoolers*	Alclad tubes
Condensers—naphtha and gasoline—T.C.C. overhead—depropanizer overhead	Alclad tubes
Coolers—gas oil and lube oil—Furfural*—Monoethanolamine*	Alclad tubes
Desulfurization of gasoline or hydrocarbons	Condenser or cooler tubes
Depropanizer overhead*	Alclad condensers or coolers
Diethanolamine*	Alclad coolers and exchangers
Drums	Laminated aluminum foil and kraft liner board
Exchangers—Furfural—mono or diethanolamine—oxygen—glycolamine—lean to rich oil	
Formaldehyde*	Tank cars and general handling
Fume ducts—sulfur di- or trioxide	
Furfural—dry or wet (320°-418° F.)*	Alclad condensers, exchangers or coolers
Fractionating columns—sulfide rich—oxygen at —300° F.—Glycolamine solutions	
Freight cars—for sulfur*	
Glycerin*	Tank cars and general
Glycolamine	Exchangers and fractionators
Hatches, vent lines, etc.	Sour stock tanks
Hydrogen sulfide—rich gases—recovery systems—scrubbers*	General
Instrument tubing*	3SO, 4SO, and 52SO alloys
Lean to rich oil—gasoline plants*	Exchanger tube bundles
Methylethyl ketone*	General and dewaxing plants
Monoethanolamine*	Alclad coolers and exchangers
Natural-gasoline plants*	Condensers, coolers and exchangers
Naphtha (sour)	Condensers and coolers
Oxygen plant*	Fractionators, bubble caps, trays, piping, etc., 3S alloy exchangers
Pipelines—sour gas or crude oil	
Pipelines—through swampy land	
Propane chillers*	Alclad 3S alloy
Raffinate (Furfural)*	Alclad tubes in exchanger coolers
Storage tanks—sour stocks	Roofs and sometimes internals
Sulfur bearing gases or liquids*	
Sulfur—molten or vapor*	Tank, vats, and general handling
Sulfurous atmospheres*	Building materials, structurals, conduits, instrument tubing, etc.
Tank cars—glycerin, ammonium nitrate solutions, acetic acid, formaldehyde, fatty acids, ketones, etc.*	For corrosion resistance as well as light weight
Vapor recovery systems	Alclad condensers and coolers
Water—fresh	Alloy tubes
Water—brackish or salt	Alclad tubes
Wax sweaters*	Aluminum sheets and alclad tubes

*Value has been definitely demonstrated.

Comments on

"Clad Plate and Linings"

(Progress in Metals, March 1, 1954, page 104)

by H. F. Peters

"Cladding does not seem to appreciably lower the thermal conductivity."

. . . It would appear that Mr. Nelson is drawing comparison with a solid plate of carbon steel, which may lead to some confusion. Actually, where clad steels, solid alloys, or lined materials are considered, carbon steel obviously must be unsatisfactory and unable to do the job. The suitability of the high-alloy materials should be weighed against each other, and not primarily against carbon steel, for such applications.

The thermal conductivity of clad steels is *greater* than that of a solid alloy material, such as the 300 and 400 Series stainless steels, Monel, Inconel, and other high-alloy materials, or that of a vessel lined with these alloy materials. For example, Type 304 and 316 solid stainless have a calculated thermal conductivity of 113 B.t.u./hour/sq. ft./°F./in. of thickness at 212° F. (compared to mild steel's conductivity of 312.) Ten per cent stainless-clad steel, Type 304, has a conductivity of 265, more than twice that of the solid stainless alloy. These high heat-transfer rates are important in heat-exchange applications.

"American practice indicates the use of clad plate is economical at plate thickness exceeding 3/8-1/2 in., whereas the British feel that thicknesses greater than 1/4 in. justify cladding."

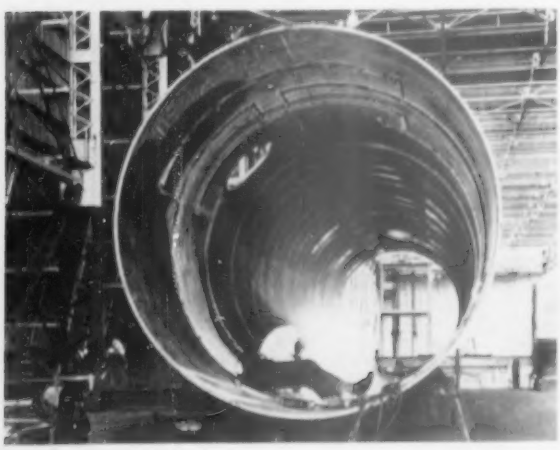
Author is manager technical service department Lukens Steel Co., Coatesville, Pa.

. . . It has been our belief and experience that clad steels in gages as low as 3/16 in. are economical. A full discussion of the economics of clad steels in light gages is not complete unless the welding and fabricating procedures are taken into consideration. We recommend that full-alloy welding procedure be used with light-gage clad plates. This method makes the comparison between light-gage clad and solid alloy comparable for both welding and fit-up.

"The fabrication of vessels from clad steels requires a double welding job and the welding of the inner or resistant material requires a special technique."

. . . The welding of clad steels does *not* necessarily require a double welding technique, nor does the welding of the inner alloy material require special techniques. It is entirely feasible, as mentioned above, to weld clad steels using a full-alloy weld. We recommend it, particularly where iron contamination is a problem in light gages, or where the economics of the construction are such that double-weld procedure is more costly.

The alloy material can be welded in the same fashion as a solid material by using a higher-alloy electrode to compensate for dilution. In certain cases Lukens' fabrication literature recommends the use of a high-alloy barrier bead to compensate for iron dilution. This is unnecessary if a higher-alloy rod is used for the entire joint.



Flash fractionator for California Oil Co., Perth Amboy, N. J., being fabricated in the shops of C. F. Braun & Co., Alhambra, Calif. Type 347, 18-8 stainless-steel-clad plates were used for this application—and other process units in this refinery, such as the twin reactor kilns, also utilized clad steels in their construction.

"In addition . . . clad steels . . . must be handled carefully in the shop to avoid damage to the somewhat thin cladding."

. . . Clad steels do *not* have to be handled with kid gloves in the shop. They require only the same degree of handling care as a full-alloy plate, to avoid surface damage which would lead to localized corrosion.

"All of this leads to a fabrication cost that is about double."

. . . This is not the case when full-alloy welds are employed. In heavier gages, it is true, the fabrication costs of clad steels are greater, but savings on materials realize an over-all cost saving.

Comments on

"What Aluminum Alloys Offers Refiners"

(Progress in Metals, July 5, 1954, page 151)

by G. W. Birdsall

OUR attention has been called to your article, "What Aluminum Alloys Offer Refiners," in the "Progress in Metals" department of the July 5, 1954 issue of your very excellent publication.

In the second and third paragraphs you have referred to the old temper designation system which has been obsolete now for a number of years . . .

In the fourth paragraph of your article, you talk about a clad variety of tube in which about 10 per cent of the surface is bonded with an aluminum alloy containing about 1 per cent zinc. This statement is inaccurate:

1. The entire surface of the tube is clad—not just a portion of it—and the 10 per cent clad, which you will find in our technical literature, refers to the fact that the outer 10 per cent of the thickness of the material consists of the clad material.

2. You say that "the zinc alloy is anodic to the base alloy." This statement oversimplifies a somewhat more complicated situation. Actually the zinc alloy has a solution potential which, in combination with the aluminum core, provides maximum resistance to corrosion for this application. So you can see that the material as published is likely to result in an impression considerably contrary to the facts.

Author is director Editorial Services, Reynolds Metals Co., Louisville, Ky.

Carter

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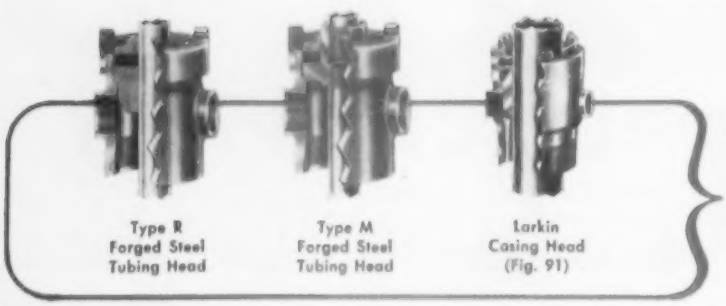

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Tubing Head

Type M
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Tubing Head

Larkin
Casing Head
(Fig. 91)

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Among the

Drilling Contractors

Watts Drilling Co., Coleman, Tex., will handle contract for a Smackover test 1⅛ miles southeast of Bodcaw in Nevada County, southwestern Arkansas. It is T. W. Murray 1 I. J. Daniels, C NW NE 9-14s-22w, ⅜ mile northeast of Rodessa production in Bodcaw field. The Smackover test will go to 6,000 ft.

J. D. Reynolds Co., Camden, Ark., will handle contract for a new wildcat near Pace City field in C SE SE NE 31-15s-17w, ¾ mile southeast of Pace City field in southern Ouachita County, south-central Arkansas. It is Harris H. Pace 1 Mary Burton. Project will go to 3,000 ft. to test the upper 200 ft. of Travis Peak.

Nowery Drilling Co., Shreveport, is handling the drilling contract for a new try near Kiblah field, Lafayette County, southwest Arkansas. It is Arthur Richenthal 1 Olivia S. Moore, C SW NW 2-20s-26w. It is 1⅛ miles northeast of production and 7½ miles southwest of Bradley, Ark. The wildcat will test the full Pettit lime section to a depth of about 7,000 ft.

Montgomery Drilling Co., El Dorado, Ark., is handling contract for an edge well at West Midway field, northern Lafayette County, Arkansas. It is McAlester Fuel Co. 1-A Graydon-Anthany Lumber Co., NW NW 7-15s-24w. The Smackover wildcat is on the edge of West Midway field production. It will go to 6,700 ft. which will test productive zone offsetting it to the east and southeast.

Tri-City Drilling Co. is contractor for a new strat test near Grande Prairie, northwestern Alberta, Canada. It is Shell Oil Co. 4 Grande Prairie-strat, LSD 4, 25-71-8w6, about 12 miles west of Grande Prairie townsite.

Lewis Drilling Co. has contracts for two wildcats in two separate areas of Kansas. The company will handle contract for Aladdin Petroleum Co. 1 Johansen, C SE SE 13-28s-19w, Kiowa County wildcat 8 miles west of Brenham pool and 2 miles west of Greensburg, Kans. In Rice County, east-central Kansas, Lewis will handle contract for Lario Oil & Gas Co. 1 Shonyo, SW SW SE 11-18s-10w, wildcat 1 mile west of West Bredfeldt pool and 1½ miles south of Bushton, Kans.

Symonds Drilling Co. has contract for H. M. Naylor Oil Co. 5-B J. B. Gehr, deep test in Fort Bend County, Texas. It is located in the Samuel Kennedy Survey A-44. Contract depth is 9,000 ft. **Blanton Drilling Co.** is contractor for a wildcat in Galveston County at Russell Maguire 1 Adriance, Rafael Basquez A-32, 2½ miles southwest of Kimah and 2 miles north of Gillock field. Contract depth is 11,500 ft.

Nicklos Drilling Co. has contract for a 10,600-ft. semiwildcat north of Bayou Fordoche field in Pointe Coupee Parish, coastal Louisiana. It is Jones-O'Brien, Inc., and Nemours Corp. 1 Olsen, 2,300 ft. north and 1,980 ft. east from the southwest corner of 20-5s-9e.

Anschutz Drilling Co. is contractor for a Buffalo Springs area wildcat in Hot Springs County, Wyoming. It is Cyprus Mines 1 Rushmore, NW SE SE 2-42n-90w, located 3½ miles east of Black Mountain.

Pyburn & Langford Drilling Co., Shreveport, has contract for a deepening project by Midstates Oil Co. 1 Olin Industries, Inc., 8-10n-14w, 2½ miles

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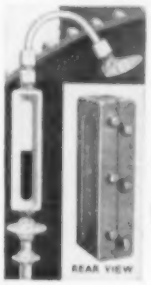
"Gotta fish out a hole; give me a pole, some line, a sinker, a hook, and some bait."

5 Advantages of an INFERNO Clamp Type Reflex Gauge



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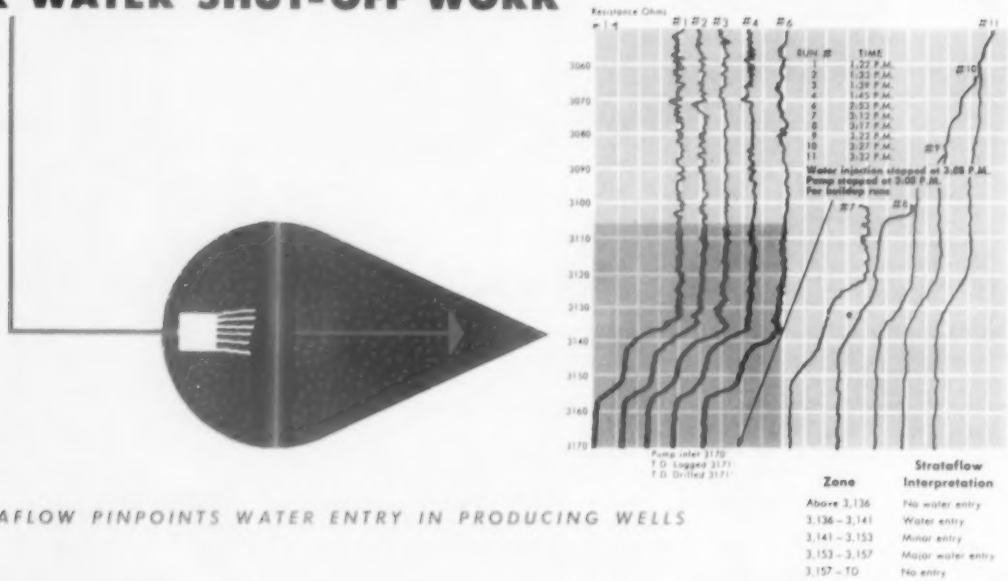

STRATAFLOW PINPOINTS WATER ENTRY IN PRODUCING WELLS

Accurate measurements of the location, volume and flow of water in producing wells may be the measure of success or failure in a water shut-off program. Halliburton's new Strataflow log, the first dependable deep hole investigator of water entry, provides the decision data required before modern cementing techniques can be successfully applied.

The continuous Strataflow log, which clearly indicates major and minor zones of water entry, is run while the well is operating under normal conditions. The well is continuously produced prior to and during the test except for a brief shut-down for water consolidation. With each water or oil formation producing normal fluid, the Strataflow survey gives a true, accurate picture of remedial needs.

Strataflow measures the marked difference in resistivity between a conditioning fluid placed in the well bore, usually fresh water, and the salty formation water. The special 1" electrode quickly records the varying resistances and transmits the data to the basic FM equipment used in all Halliburton logging work. The simplified technique and equipment means that Strataflow can be easily run without expensive modifications in any well in which the I.D. of the casing exceeds the diameter of the tubing collar by 1½" or more.

You'll find that Strataflow is dependable, easy to interpret, widely applicable and economically practical. And with its proved record of helping restore marginal wells to profitable producers, you can confidently base your decisions for remedial work on sound, accurate data—the decision data that is the first step towards successful water shut-off. Call your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

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Strataflow—Reg. U. S. Pat. Off.

PERPETUAL PROGRESS IN PRODUCTION IMPROVEMENT TECHNIQUES

southeast of Hunter in southern DeSoto Parish, Louisiana. Midstates plans to drill the hole to 8,000 ft. for a look at the deeper Travis Peak sands. The wildcat was scheduled originally to 7,000 ft.

C. A. Lee is handling contract for Weiser-Brown Oil Co., successor to Burnett Production, and Marine Oil Co. 1 Marine Oil et al, NE NW 30-16s-23w, new wildcat 1 mile south of Lewisville field in central Lafayette County, Arkansas. Production will be sought in the Paluxy. The well will go to 4,000 ft. if structural position calls for it.

Stanford Drilling Co., Santa Maria, Calif., has been awarded a three-well drilling contract by Union Oil Co. to explore the oil potential of the Santa Maria River bottom and an area north of Santa Maria Valley field. The first well will be the 1 Bognuda. The 1 Haslam and 1 Donovan, south of the 1 Bognuda, will be drilled as soon as data can be obtained from the 1 Bognuda. The wells are about 2 miles north of Bonita School.

Drilling & Production Co. will handle the drilling contract work for two wells on the Corral lease in Tejon Hills field, California. DK Partnership Two 274-29 Coral is in 29-11-18. The 274-29 Corral, is in 29-11-18, also. The wells are in the Springs Fault area at Tejon Hills. Both are development and extension wells.

Pike Drilling Co. will be contractor for Moriqui Exploration Co.'s new exploratory work in the Greeley area of California. Moriqui will drill a "17" location on Section 26-29-26, less than 1 mile north of Bellevue field production and several miles southeast of production in Greeley field. The 17-26 Ricard Bros. will go to about 8,500 ft. to take a look at the Stevens sand's possibilities.

Lohman-Johnson Drilling Co. has contract for a wildcat in Washington County, Colorado, in the Denver-Julesburg basin. It is Woodward Oil, Inc.-Lohman-Johnson Drilling Co. 1 Nelson, SE SE SW 24-2s-56w, 6½ miles east of South Badger Creek.

Brown Drilling Co. is contractor for Superior Oil Co.'s third deeper pool well in Cymric field on the west side of the San Joaquin Valley, Central California. The first well was completed 1 year ago for a discovery in the second Point of Rocks. The 3 Cymric Unit is located in 22-29-21.

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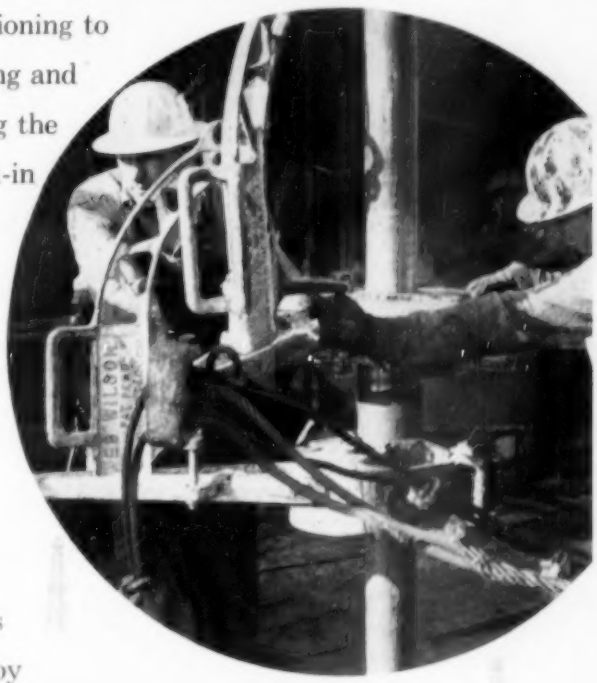

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1 Pipe is tack-welded by hand after being lined up with internal clamps. Welding wire from case at right feeds through gun.

2 Following tack welding, the automatic unit is lowered onto pipe. The tubular guard rail surrounding the unit insures unimpeded travel around pipe for a uniform weld.

3 Push-button control unit governs travel of gun. The operation is synchronized so that wire feed, travel, gas, and power are controlled simultaneously.

4 Final coating and wrapping of field joints is completed prior to lowering pipe in ditch. Pipe was yard coated with conventional pipeline enamel.

Here's a field-test report on the newest process of

Welding aluminum pipe automatically

by F. Lawrence Resen

AN automatic welding unit for aluminum pipe has recently completed its first full-scale test. Using this unit, 4,000 ft. of 8-in. aluminum pipe in 40-ft. joints was laid in one 8-hour shift. *(The Oil and Gas Journal, March 15, 1954, page 79.)*

Developed by Reynolds Metal Co. and Air Reduction Sales Co., the 200-lb. unit incorporates automatic features designed to improve aluminum welding practices and remove a stumbling block to economical use of aluminum pipe.

A feature of the equipment is the use of a shielded arc, surrounded by inert gas.

Early difficulty . . . Quite significant in the development of the unit has been the experience gathered in early days of aluminum welding. Difficulties were encountered in attempting to break through the aluminum-oxide layer which forms on the surface of all exposed aluminum. The thin, nonporous film is actually a protective coating for the surface, and while it is a highly desirable property for this reason, its high-melting point and ability to form almost instantly has been a serious technical handicap to welding.

The present method completely eliminates the use of any flux by using the intense heat of an electric arc—about 9,300° F.—to disintegrate the aluminum oxide and by surrounding the weld area with inert gas during the actual welding. In this way, the weld may be completed with no cleaning whatsoever. Either argon, helium, or a mixture of the two is used as the inert medium.

Automatic machine . . . The welding unit consists essentially of a bracket for surrounding the pipe, a quick-acting clamp for securing the bracket, a welding gun with shield, a gear train with electric-motor drive for moving the gun, a reel for supporting a coil

PIPELINE PATROL

LOWERING-IN OPERATIONS give an indication of the pipe's flexibility. Pipe was formed by the extrusion process.

of welding wire, and an electric motor for feeding the wire into the gun. The entire unit is surrounded by tubular guard rails which insure unimpeded movement. Power leads and a gas line connect to the machine and to auxiliary equipment which is carried on a truck.

In the welding operation, the joint is first lined up with external clamps and tack welded with a shielded-arc gun. Next, the automatic unit is lowered onto the pipe, the clamps set, and the gun accurately lined up.

From this point on the unit is operated by push-button control. The wire feed, travel of the gun, inert-gas supply, and electric power are all synchronized to a controller which the operator uses to guide the movement of the unit. The unit is used to weld half of the pipe at a time.

Successful field usage . . . A demonstration of the unit was held recently when Reynolds laid a 12-mile gas line from the White Point field to its alumina plant near Corpus Christi, Tex. In laying the 858-in. line, an average time of 2 minutes was required by the machine for making each four-bead weld.

An interesting aspect of the demonstration was the bursting-pressure test placed on welded sections of the aluminum pipeline. This was done to show the improved characteristics of the weld when compared to manual arc welding using a shielded tungsten electrode. This latter method has also been developed to eliminate the oxide coating, but the time required to complete a weld is such as to "heat-weaken" the aluminum pipe. Pipe welded by this method withstood pressures of only

ON THE FIRING LINE of an aluminum pipeline job. Truck in center carries tack-welding equipment and sideboom handles automatic welding machine.

See Composite and Refinery Catalogs, or Write for Folder On

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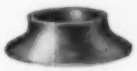
ASTM A234

Also for pressure vessel heads



Nominal pipe sizes 1" to 30"

Special sizes, lengths, schedules

ASA B16.9
ASTM A234

Eccentric

Immediate Delivery

STEEL FORGINGS, Inc.

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In every phase of pipe line construction is an important factor in Houston Contracting's facilities.

HOUSTON CONTRACTING CO. LTD.
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OIL • GAS • GASOLINE • WATER PIPE LINES
2707 FERNDALE • HOUSTON 6, TEXAS
GENERAL PARTNERS
LAURENCE H. FAVROT • R. P. GREGORY
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PIPELINE PATROL

1,400 psi. compared to a calculated bursting pressure of 2,100 psi.

In contrast, pipe welded by the automatic unit withstood pressures up to 1,800 psi. on a hydrostatic test. Reasons given for this significant increase are that the speed of the automatic unit prevents excess heat from damaging the metal back from the weld area, and that the completed weld has a cast structure that is ⅓ to ⅔ smaller than that of manually-made welds.

The particular line laid near Corpus Christi was designed to handle gas at 500 psi. Upon completion, it was tested to a pressure of 1,000 psi., using gas as the testing medium.

Tie valves down!

UNLESS foundations are properly designed, the "jet" action of gas issuing from blowdown valves can seriously damage a piping system. Action of the blowdown system can be compared to a jet plane's engine. When the valve is opened, the gas issues into the atmosphere at very high velocity and the jet action of the discharging gas results in a reaction force on the piping system, causing it to attempt to

move in a direction opposite to that of the gas.

In a case recently investigated by engineers of the meter and valve division of Rockwell Manufacturing Co., the jet effect amounted to the equivalent of 16,000 hp.—far greater than the power of any jet engine in existance.

To avoid severe damage to the blowdown system resulting from this phenomenon, it is necessary to design and install a foundation that can "take" the reactive force. The jet effect is most severe at the beginning of the blowdown period, therefore the foundation should be designed to take care of this maximum force.

PIPELINE KETTLES
STATIONARY CLEANING & PRIMING MACHINES
FARO PIPE RECONDITIONING EQUIPMENT
PORTABLE GENERATORS
ROAD BORING MACHINES
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MODEL 211-10 P2
PIPELINE COATING KETTLE
For transporting on highway.
For tough pipeline terrain.
10 Barrel capacity, complete with hydraulically operated agitator and low pressure burner, self-starting air cooled gasoline power unit. Mounted on tandem rocker beam assembly. Equipped with pneumatic tires and detachable (tire) tracks.
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DEALERS IN: HOUSTON • NEW YORK • NEWARK, N. J.
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SPECIALIZED EQUIPMENT FOR THE PIPELINE INDUSTRY

ATLAS PROCESSING COMPANY *at* Shreveport, Louisiana, has recently placed in operation this Hudson-Built benzene recovery plant, the first to recover substantial quantities of natural benzene from liquid hydrocarbons extracted from natural gas. Over 98% of the benzene present in motor fuel base stocks produced in gas processing plants in the Carthage gas distillate field of East Texas is extracted in this unit. The benzene is nitration grade having a purity of over 99.6%. Hudson is proud of its part in implementing the concept of the Atlas management in this pioneering operation.

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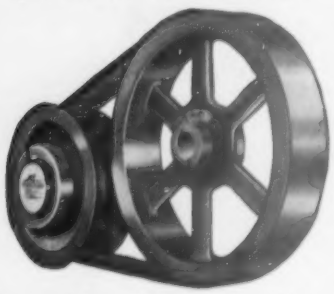
Where minute speed adjustment is needed . . .



Specify Wood's New Variable Speed Drive

Here's an economical variable speed drive that can be adjusted for infinitely variable speed within its range. By simply turning an adjusting screw on either side of the variable pitch sheave, both flanges move simultaneously and speed changes are obtained quickly and easily.

Positive clamping of the two adjustable flanges eliminates fretting corrosion. Single wide range belt for motors 5 to 20 horsepower provides speed range ratios up to 3 to 1 . . . no lubrication . . . less shaft overhang . . . much less vibration than multiple groove variable speed drives because there's no matching of belts . . . sensibly priced and economical in operation . . . send for Bulletin 796 for detailed information.

T. B. Wood's SONS COMPANY
1117 W. COMMERCE ST., DALLAS, TEX.

REFINING

Contracts Awarded

Caltex gets large order from ASPPA for jet fuel

WASHINGTON.—Caltex Oil Products Co. has received a negotiated contract for 62,412,000 gal. of JP aircraft fuel, the largest single order awarded for the period ended August 13 by Armed Services Petroleum Purchasing Agency.

Ten other awards, resulting from advertised bids and offers received in requests to proposals, also were made. The ASPPA said that agency policy was to release the dollar value of advertised bids but not of negotiated contracts.

The ten other contracts are:

Standard Oil Co. of California awarded contract for 40,000 gal. of motor gasoline and 52,345 gal. of fuel oil.

Gulf Oil Corp. awarded contract for 4,500 gal. of No. 2 fuel oil.

Atlantic Refining Co. awarded contract for 7,200 gal. of 74 octane motor fuel.

Seaside Oil Co. awarded contract for 10,080 gal. of fuel oil.

Gulf awarded contract for 2,500 gal. of 90 octane aviation fuel.

Esso Export Corp. awarded contract for 105,500 gal. of 115-145 aircraft engine fuel.

Jesco Lubricants Co. awarded contract for 2,500 lb. of lubricant.

Southwest Grease & Oil Co. awarded contract for 4,760 lb. of lubricant.

The Texas Co. awarded contract for 115,000 bbl. of diesel fuel oil.

Socony - Vacuum Oil Co., Inc., awarded contract for 50,000 bbl. of diesel fuel oil.

Socal Announces Plans To Build Model Wharf

PORT WELLS, Wash.—Standard Oil Co. of California will completely rebuild its wharf facilities here as a model project designed to reduce the hazards of fire from ship collision.

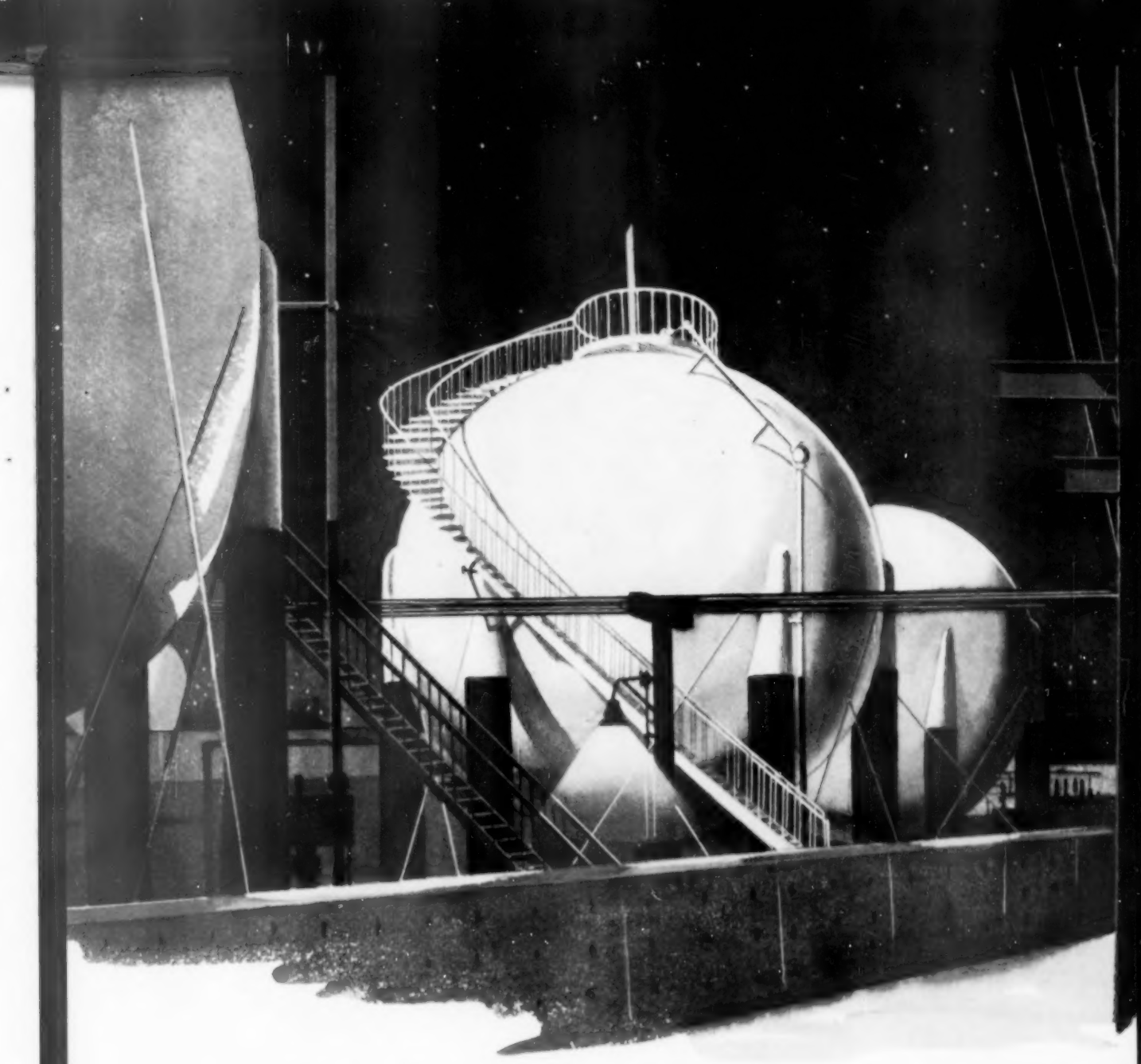
Socal's dock at the big distributing plant was partially destroyed by fire last January when the tanker J. L. Hanna ran through its wooden surface while attempting to tie up during a fast-running tide.

The new wharf will be about 200 ft. south of the present location and its face will be turned about 4 degrees counterclockwise. The relocation is expected to overcome tidal influences along the eastern edge of Puget Sound which have made it difficult for big tankers to dock.

The new wharf, which will have space for two tankers and two barges, will feature central control of air-operated

Platformer Aids in Shell's Ammonia Operations

Shell Oil Co. is getting double duty out of this recently completed Platformer at its Martinez, Calif., refinery. The 5,000-bbl. unit, in addition to boosting the rating of feed stock by about 25 research octane numbers, also furnishes 5,000,000 cu. ft. of hydrogen per day which is moved to the nearby Pittsburg, Calif., plant of Shell Chemical Corp. The hydrogen is then reacted with nitrogen to produce anhydrous ammonia. To date the only other ammonia synthesis from catalytic reforming hydrogen is the 100-ton per day plant now on stream at Atlantic Refining Co.'s Philadelphia refinery (The Oil and Gas Journal, August 2, page 58).



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The successful marketing of today's petroleum products depends upon an experienced organization. Behind Beacon are years of successful operation... your assurance of dependable service.

If you have Butane-Propane, Deisel Fuel, Natural Gasoline or any other petroleum products to sell contact Beacon . . . or if you want to buy any petroleum products . . . contact Beacon.

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MARKETERS OF NATURAL GASOLINE, BUTANE-PROPANE, MOTOR FUEL, FUEL OILS

valves and an automatic shutoff of all electric power to the dock in the event of a collision.

Gulf May Close Refinery

PITTSBURGH.—Gulf Oil Corp. is reported considering closing its 15,000 bbl. per day Neville Island refinery here within the next 60 days.

The refinery has been running at less than capacity most of the year and economic studies have shown that the company could not enlarge the plant to meet the large demand the company anticipates the area will require within the next few years.

If the refinery is shut down, it will make the second small refinery that Gulf has closed this year. On May 1 the company closed its 42-year-old refinery at Fort Worth, also for economic reasons *(The Oil and Gas Journal, page 184, April 12)*.

Unit Nears Completion

PORT ARTHUR, Tex. — Atlantic Refining Co. is building a Girbotol purification plant to remove hydrogen sulfide from its catalytic reformer recycle stream at its Atreco refinery here.

The plant, which is being built by Girdler Co., Louisville, is expected to go on stream by September 1. The company recently completed a Girbotol unit for Atlantic at its Philadelphia refinery.

Small Refinery Bought

HOUSTON.—M&M Oil Co., of Houston, has bought the 250-bbl. per day refinery of Jacksboro Refineries, Inc., at Jacksboro, Tex.

M&M officials said that the plant would be thoroughly modernized and its capacity raised to 1,000 bbl. per day. The refinery operates on crude produced in Jack County of North Texas.

Petrochemicals

Allied To Double Ammonia Capacity of Omaha Plant

OMAHA.—Nitrogen Division of Allied Chemical & Dye Corp. will double the capacity of its ammonia plant here as soon as the necessary supply of natural gas becomes available.

The company recently completed its plant here, which has a capacity of 61,000 tons of nitrogen annually in the form of both ammonia and urea. The ammonia facilities were placed on stream in April and the urea facilities in July.

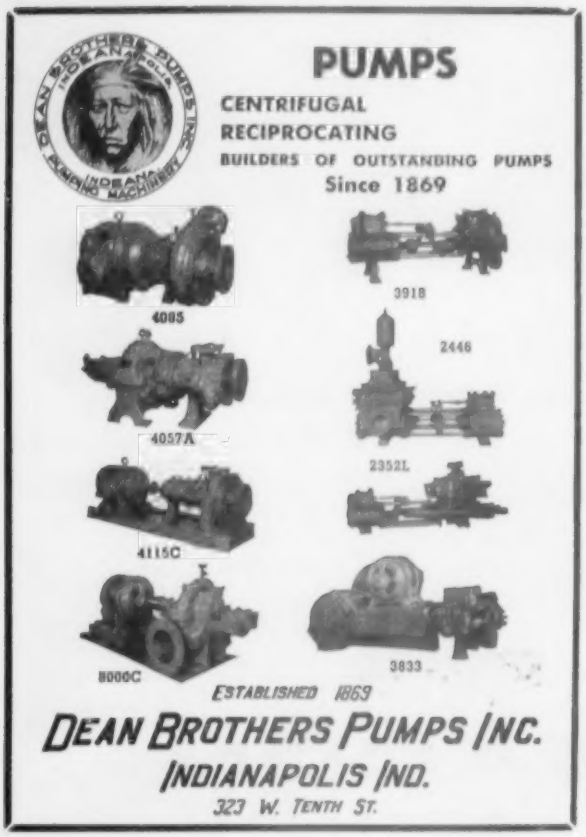
Allied is one of the many petrochemical companies building its nitrogen plants in an agricultural area in order to be closer to the markets served *(The Oil and Gas Journal, May 3, page 58)*.

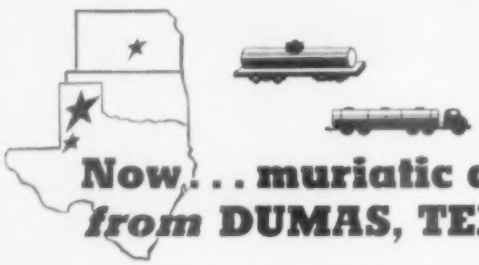
Shell Starts Work On Ammonia Storage Tanks

PASCO, Wash.—Shell Chemical Co. has begun work here on two ammonia storage spheres, each with a capacity of 2,700 tons.

The storage facilities will be supplied with ammonia from Shell's Pittsburg, Calif., plant.

An ocean-going barge will transport the ammonia from Pittsburg through the Golden Gate and along the coast to Shell's Portland, Ore., terminal. Part of the ammonia will be retained at Portland to supply needs in western Oregon and Washington and the rest will be shipped by river barge up the Columbia River to Pasco.





Now . . . muriatic acid *from* DUMAS, TEXAS

Muriatic acid in tank car or highway tanker lots is now promptly available from a new shipping point – Dumas, Texas. Frontier has contracted for the entire HCl output of the Potash Corporation of America plant there – as an additional service to Frontier customers.

Frontier-owned plants and their products are:

Denver City, Texas – caustic soda, muriatic acid, salt
Wichita, Kansas – caustic soda, muriatic acid, chlorine, benzene hexachloride

Speedy shipment over uncongested routes brings dependable "always-as-specified" Frontier chemicals within overnight reach of many users . . . offers transportation and storage savings. Check with us . . . now!

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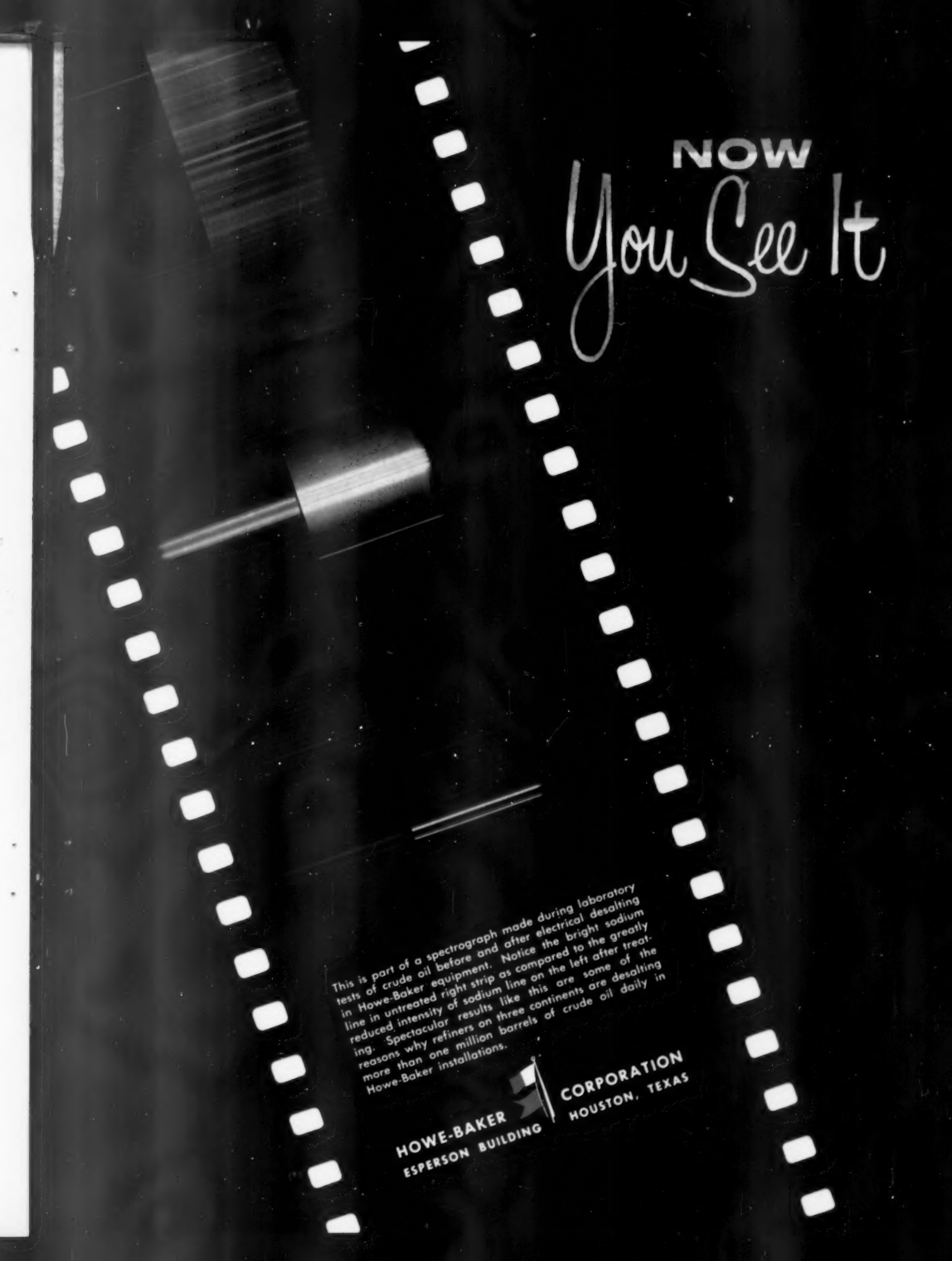
NOW
You See It
This is part of a spectrograph made during laboratory tests of crude oil before and after electrical desalting in Howe-Baker equipment. Notice the bright sodium line in untreated right strip as compared to the greatly reduced intensity of sodium line on the left after treating. Spectacular results like this are some of the reasons why refiners on three continents are desalting more than one million barrels of crude oil daily in Howe-Baker installations.
HOWE-BAKER CORPORATION
ESPERSON BUILDING HOUSTON, TEXAS

The fittings that revolutionized pipe welding . . .

In the year 1931 Taylor Forge gave industry its *first real line* of seamless, butt-welding pipe fittings. We say it was the first *real* line because it was the first to include not only long and short radius ells, but also full branch and reducing tees, concentric and eccentric reducers, stub ends, caps and welding neck flanges.

This was a fully planned development. Many years before Taylor Forge had foreseen the future of the butt-welding fitting . . . had realized that pipe welding could not go beyond its then crude stage until pipe users were given *all* the fittings necessary to make up complete piping systems.

So Taylor Forge went to work on this and after long research and development came out with the full line that became the inspiration of modern pipe welding.

Naturally the organization that started ahead has kept ahead . . . in design, in quality, in breadth of line. That is why so many men who have followed the development of the WeldELL line, refuse to consider any other kind of welding fittings.

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For up-to-the-minute facts,
see your Taylor Forge distributor

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Want more information on products advertised in this issue? Or do you want to know more about the items described in the "New Equipment Section"? Or would you like some of the literature here mentioned?

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The cards shown here are supplied for your convenience. Just ✓ ✓ ✓ check the circle with the number of the item in which you are interested, tear off the card, and drop it in the mail.

We do the rest

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We'll get it for you

(No postage required)

. . . What's New in Equipment?

Use the handy Time-Saver Cards ✓✓✓ to obtain additional information on these items

by Dan B. Miller

Fracturing Equipment Added to Method

Rapid acceptance and widespread use of this new fracturing technique for improving oil wells has been accompanied by numerous improvements in well-treating techniques and in the equipment required. This unit features continuous-mixing apparatus incorporating hydraulically operated paddle mixer and equipment for accurate proportioning of the sand and oil.

The sand tank has two screw conveyors which meter sand into the continuous mixer located below the trailer frame just in front of the rear tandem wheels. Amount of sand added to make up the fracturing fluid can be very accurately controlled. Range for this unit varies between ½ and 6 lb. per gal.

In some treatments small volumes of Mud Acid are used ahead of the fracturing chemicals. In such treatments the Mud Acid is frequently carried to the well in the continuous mixer which has a capacity of 2,000 gal. The over-all length of this new unit is 43 ft., and its weighs 45,000 lb. *Dowell Incorporated.*

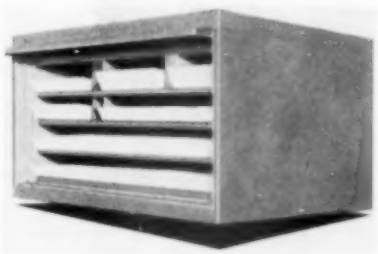
Check No. 1 On The Time Saver Card

●

New Cut-Sheet Cabinet Protects Sensitized Paper

Sensitized sheets, used in direct-positive printing machines, can now be protected from light and humidity and be conveniently stored in a new cut-sheet cabinet. This all-steel unit has a drop door which recedes into the top of the cabinet. Compartments will hold the following size sheets: 8½ by 11 in., 9 by 12 in., 12 by 18 in. or adjustable for 11 by 17-in. sheets, 8½ by 14 in., 18 by 24 in., or adjustable for 17 by 22-in. sheets, 24 by 36 in. or adjustable for 22 by 34-in. sheets, and also one additional compartment for 24 by 36-in. sheets.

Edges of the sheets are automatically fanned out so the operator can quickly count the number of sheets desired. Handy access to the compartments eliminates the tedious chore of opening



and closing packages as sensitized sheets are needed. The cabinet is designed to reduce exposure of sheets to light and to reduce spoilage of paper. A special dehydrant absorbs the humidity from the sheets when the door is closed at night and at other times. The cabinet is fire resistant and protects the sheets against dust, dirt, dampness, and vermin. *Ross-Martin Co.*

Check No. 2 On The Time Saver Card

●

Gas-Actuated Plug-Valve Operator for Remote Control

The Bettis plug-valve operator is a gas-actuated attachment for remote-control operation of plug valves. The operators can be easily installed on plug valves in the field without special tools.

Valves from 1 to 4 in. can be readily opened and closed on gas pressure of 15 to 100 lb. These plug-valve operators require only one gas operating line for opening and pressure closing. They are friction free, having no pistons or packing glands, and are failure-safe on loss of control pressure. *Bettis Corp.*

Check No. 3 On The Time Saver Card

●

Antiseize Compound Gets Underwriters' Approval

An improved and recently developed antiseize sealing compound has just received official approval of Underwriters' Laboratories, Inc. The approval specifically covers its use in joining threaded pipe connections or other close-fitting metal parts in devices handling propane, butane, gasoline, or petroleum oils, to render joints tight against leakage. The product, designated as Armite Led-Plate No. 250, was particularly developed for the petroleum industry. *Armite Laboratories.*

Check No. 4 On The Time Saver Card

●

BIW BLOCKS

BUILD GREATER DRILLING EFFICIENCY!

New, two way bearings on the Type KN Crown Block and the Type PN Traveling Block handle both radial and thrust loads as pure right angle loads. This design increases bearing capacity, reduces weight, and cuts space requirements. Longer bearing life results plus reduced maintenance and replacement costs.

The Crown Block can be hoisted through the water table in one piece. Because the center pin is on the center line of the beam, either flange of the beam can be set on the water table beams. The narrow width of the 300 ton capacity Traveling Block permits maximum pipe racking for deep drilling. With its low center of gravity, kicking or side lift is kept to a minimum. Bearings and sheaves are interchangeable between Crown and Traveling blocks.

ALCO

AMERICAN LOCOMOTIVE COMPANY

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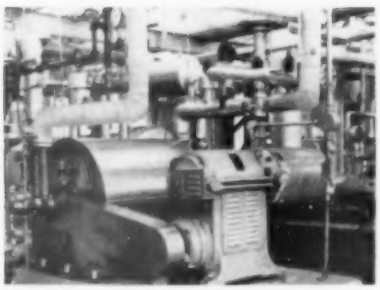

New Solvent Extractor Is Much Smaller Than Tower

The centrifugal, countercurrent, solvent extractor represents a completely new approach to the design of equipment for contacting two liquids, including suspended solids, as in solvent extraction, chemical reaction, washing, neutralization, caustic treating, and similar processes.

The two phases are forced into extremely intimate countercurrent contact by centrifugal force, up to 5,000 times gravity, in compact rotors with combinations of perforated concentric cylinders and spiral-type passageways analogous to gravitational sieve plates. Even easily emulsified and small-density, dirty liquids can be effectively processed. It is now being used in phenol and furfual refining of lubricating oils. *Podbielniak, Inc.*

Check No. 5 On The Time Saver Card

●

Primer Coating Developed To Protect Pipe in Storage

A new primer coating is specifically designed to provide protection for pipe in storage. This protective primer, designated A-457, is a highly refined, vegetable-resin compound formulated to fulfill the need for a good pipe-protective coating which would serve equally well as a primer for hot-or-cold-applied protective coatings.

A-457 gives complete weather resistance in aboveground storage for a minimum of two years. It retains indefinitely its adhesion, resolubility, temperature resistance, and elasticity, and so remains compatible with both cold and hot top-coatings. A high electrical resistivity is coupled with resistance to alkali produced by cathodic protection.

A-457 produces a film thickness of 2 to 3 mils using 350 sq. ft. per gal. applied by brush, spray, flow coat, or Roskoter. Drying time is from 5 to 10 minutes. *Royston Laboratories, Inc.*

Check No. 6 On The Time Saver Card

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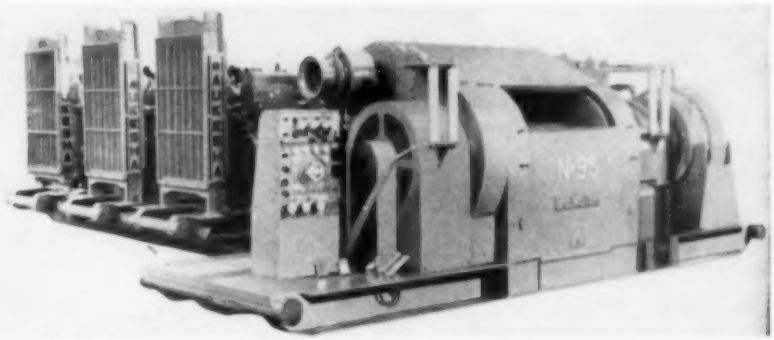


14,000 Ft. Unit Is Moved As a Package

Already in the field making hole, the new Brewster 1,200 hp. N-95 offers 14,000-ft. drilling with a draw works that can be moved as a single package. Controls, transmission, rotary drive, and hydromatic brake are all mounted on the main skid. Available in a wide selection of horsepower combinations and a choice of direct-mechanical, fluid-coupling, or torque-converter drive arrangements, the N-95 maintains economy of operation and maximum efficiency over a wide drilling range of 8,000 to 14,000 ft.

Equipped with a graduated-power transmission, the N-95 has eight forward and one reverse speed to the rotary. Pump speed can be easily maintained at maximum without increasing rotary speeds. The N-95 has the largest main drum in a rig of this horsepower class.

The compound is full oil-bath with pressure lubrication of all shafts, chains, and bearings. Dual in-line V-belt pump drives at the rear of the compound simplify rigging up and manifolding, and eliminate the need for idlers or notching the substructure. *Brewster Co., Inc.*

Check No. 7 On The Time Saver Card

●

Oil-Field Engine Built for Use With Natural Gas

The one-cylinder Power Chief gas engine is built as a low-cost, medium-speed unit for oil-field service where natural gas is advantageously available. It supplements the Nordberg one, two, and three-cylinder, 10 to 45-hp. Power Chief diesel engines.

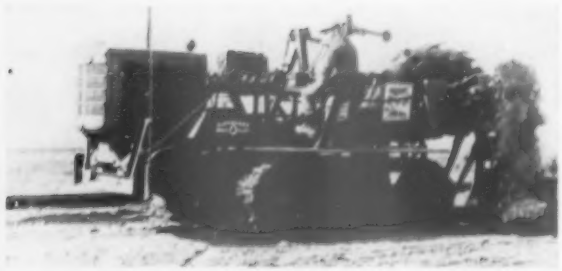
This new engine is rated at from 9 to 18 maximum b.hp. within an operating speed range of 800 to 1,800 r.p.m. It has a 4½-in. bore and 5¼-in. stroke and is an extra-heavy-duty, vertical, spark-ignition, four-cycle engine. Currently produced only in the single-cylinder model, it is available as a complete, self-contained, ready-to-operate power unit with clutch power takeoff, and as a packaged generator set producing up to 10 kw. Major parts of the gas and diesel engines are identical, permitting conversion of one to the other at very reasonable cost.

The gas engine is designed to start and operate efficiently on natural gas or gasoline. The engine ignition system is furnished complete and includes a magneto with impulse coupling, ignition cable, and spark plug. A speed-regulating governor, gear driven from the crankshaft, regulates fuel to the combination natural gas-gasoline carburetor in accordance with engine-load requirements. *Nordberg Manufacturing Co.*

Check No. 8 On The Time Saver Card

●

What's New... Use the handy Time-Saver Cards



New Trencher Made For Pipeline Use

A new heavy-duty trenching machine for pipelines and similar heavy-construction jobs, the Cleveland Model 240, is a full-crawler-mounted, wheel-type trencher which digs up to 36-in. wide and down to 6-ft. 3-in. deep.

Its low ground-bearing pressure of 6.3 psi. is outstandingly effective because the 240 is balanced perfectly at the center of its nonpacking crawlers. This enables it to work effectively in the wettest rights-of-way and to overcome the toughest hills.

The Cleveland 240's digging wheel employs a front upper truck as well as a rear upper truck. This additional 3-in.-diameter truck, mounted on self-aligning bearings, supports the digging wheel.

The new crawler "kickout" clutch permits stopping the crawlers without halting the digging wheel's operation, thus providing more production in tough digging. The 30 in. wide reversible conveyor discharges spoil on either side of trench. Over-all length is 24½ ft. and road width is 8 ft. The 240 is powered by a 460-cu.-in. diesel engine delivering 65 hp. at 1,200 r.p.m. *The Cleveland Trencher Co.*

Check No. 9 On The Time Saver Card

●

Graloc Designed As An All-Purpose Pipe Connector

A new connection, the Graloc, has been designed to offer industry a one-specification connection for all piping applications and pressure ratings. It requires no selection of gaskets, facings, or bolts, and all parts are fully interchangeable and reusable. The connection employs a two-bolt clamping principle and a stored-energy seal.

A steel sealing ring with flexible lips and a rigid rib fits between the steel connecting hubs. The angle of the tapered lips of the ring is less than the tapered seats of the hubs. As the joint is made up, the lips of the seal ring conform to the seats of the hub, thereby utilizing the elasticity of the steel to effect a positive seal. Internal line pressure serves to increase the effectiveness of the seal.

The rib of the seal ring affords rigidity, acts as a positive-stop means, and lends strength to resist the bursting tendency caused by fluid pressure. Instead of the usual bolting, Graloc uses a two-piece steel clamp which works against tapered shoulders on the connecting hubs. Bolting can be handled from the top, bottom, or side, and the entire connection can be assembled quickly with no necessity for periodic retightening.

The Graloc connection will far exceed the pressure limits in the heaviest wall pipe. Because it is of all-steel construction, expansion or contraction does not affect the seal. It is leakproof when used with any fluid at any temperature the pipe is capable of carrying, including light hydrocarbons, steam, and low molecular-weight gases.

The Graloc connection is rated at 10,000 psi. internal pressure. The standard Graloc connection is about one-half the weight of a comparable 300 lb. flanged connection, and one-eighth the weight of a 2,500 lb. flanged connection. The outside diameter and length of Graloc connections are less than 150 lb. A.S.A. flanges.

Standard Graloc connections are made in three styles: butt welding, slip-on, and threaded, in a range of sizes from 1½ to 12 in. for all standard weights from schedule 40 through schedule 160. *The Gray Tool Co.*

Check No. 10 On The Time Saver Card

●

Magnaflux Y-5 Yoke Kit Is One-Man Operated

An entirely different magnetic-particle inspection kit offers lightweight, portability, and low cost. It is designed especially for preventive-maintenance inspection, for weld inspection, and for limited-volume inspection of any magnetic part wherever surface cracks are suspected.

The Y-5 yoke kit gives the full reliability of inspection by Magnaflux. It comes in a metal carrying case about the size of a fishing box and weighs less than 30 lb. complete. The yoke itself is the magnetizing and testing instrument and weighs only 7 lb. Magnaflux powder, powder bulbs, and operating instructions complete the kit. The yoke is equipped with a 100 ft. cord. It draws only 6 amp. from any 110-volt a.c. line.

The Magnaflux yoke is particularly suited to rapid inspection for surface cracks typical of fatigue. It will find any surface cracks caused in service. Because it uses a.c. magnetization, no confusing subsurface indications will be developed. The chemical and petroleum industries will find considerable use for the yoke for checking pump parts, valve bodies, and welds. In new welds, similar surface defects or shrink cracks can be found. *Magnaflux Corp.*

Check No. 11 On The Time Saver Card

●

FIXAFRAC SEALED UNPRODUCTIVE ZONE TO MAKE ACIDIZING EFFECTIVE

Temporary plugging service by DOWELL helped increase production from 0 to 188 BOPD

A new well in a limestone formation failed to produce oil in commercial quantities even after an acidizing treatment.

Dowell engineers, called on the job, recommended and performed a second acid treatment, using a Fixafrac* temporary plug ahead of the acid. Following the treatment, the well flowed 188 barrels of oil per day.

Fixafrac—exclusive with Dowell—is used to prevent the entry of acidizing and fracturing fluids into unproductive, depleted, or previously treated zones of the pay formation. The material used carries suspended solids which react after a short time causing the Fixafrac to liquefy and flow back freely to the well bore.

Dowell engineers perform these treatments using the latest techniques, modern tools and high-pressure, high-volume equipment.

For more information about Fixafrac or any of the many Dowell oil field services, call Dowell today or write DOWELL INCORPORATED, Tulsa 1, Oklahoma, Dept. H-11.

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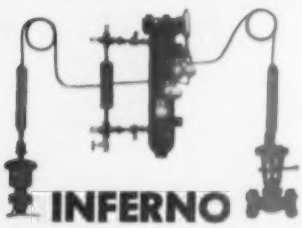

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Monofin-Plate-Type Fin and Round-Tube Core. The new Catalog 5554 is fully illustrated with cross-section drawings and points out leading features. Providing 58 per cent more extended surface and seven times more heat-transfer surface than the circular-fin-core type, the Monofin core is designed for engine cooling units, and for cooling oil, gas, or compressed air. *Young Radiator Co.*

Check No. 12 On The Time Saver Card

●

Retaining Production Packer. Catalog Section No. 306 is devoted entirely to the subject of permanent-type well completions. It contains the practical thinking of men who are actively engaged in completing wells. The presentation has been edited and arranged so that anyone, whether or not he is familiar with the procedures, can add materially to his knowledge of permanent-type well completions. *Baker Oil Tools, Inc.*

Check No. 13 On The Time Saver Card

●

Electric Equipment for Process Industries. GED-1966A, a 28-page publication, provides detailed information on: electrical equipment for power generation; power distribution and conversion; power utilization; instrumentation; descriptive publications; and service shops and warehouses. *General Electric Co.*

Check No. 14 On The Time Saver Card

●

Important Facts About Forest Products to Combat Lost Circulation is the title of a four-page brochure that describes Silvacel, Silvaflake, and Superbridge. Important characteristics of each product are outlined, and applications of each are suggested. *Weyerhaeuser Timber Co.*

Check No. 15 On The Time Saver Card

●

Revised Flange and Coupling Selector. In an easy-to-read slide-rule form, it provides such relevant facts as the o.d. of flange, thickness, o.d. of raised face, number of holes, diameter of holes, diameter of bolts, and bolt circle for Series 15 and 30 flanges. It shows average sizes of standard, extra-heavy 3,000-lb. and 6,000-lb. couplings. *Nooter Corp.*

Check No. 16 On The Time Saver Card

●

Morse Mechanical Power-Transmission Products. A newly revised eight-page, two-color Catalog B20-53 describes and illustrates silent-chain, roller-chain, and Hy-Vo drives sprockets, cable chains, drive shafts, couplings, and clutches. New information is included in the catalog on Taper-Lock sprockets, cam clutches, and torque-limiting clutches. Brief specifications, stock sizes, applications, and descriptions are included for each product. *Morse Chain Co.*

Check No. 17 On The Time Saver Card

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Centrifugal Pumps That Prime is a complete 12-page descriptive bulletin on O Series pumps. A cutaway view of the pump is shown illustrating the straight-in suction with no-check-valve feature. This provides greater safety, dependability, savings, and performance. The O Series centrifugal pumps are designed to meet the requirements for handling petroleum and industrial liquids under a great variety of conditions and applications. The line includes vertical pumps for small spaces, gear-driven pumps for power takeoff, pedestal mounts for customers power, or complete engine or motor-driven units. *Gorman-Rupp Co.*

Check No. 18 On The Time Saver Card

●

Cushioned Flowtrol Valve is fully described in a new technical bulletin W8-A. The Flowtrol valve was designed to replace troublesome globe, angle, plug, or gate valves that require frequent manual opening and closing at considerable waste of time and effort. One man can easily operate the valve to either the fully open or tightly closed position, when the valve size is 2 or 36 in., or when the pressure in the line is 15 or 400 psi. *Golden-Anderson Valve Specialty Co.*

Check No. 19 On The Time Saver Card

●

Small-Size Ball-Bearing Swivel Fittings, a new colored descriptive bulletin, covers Emsco HP and HT small-size, high-pressure, and high-temperature ball-bearing swivel fittings. The line ranges in size from ⅜ to 1 in. and from working pressures of 6,000 psi. at 225° F. to 1,250 psi. at 750°F. These fittings are versatile in their application and will find broad oil-industry usage.

The new sales bulletin describes the method of construction and application of these fittings. It gives complete dimensions, specifications, weights, and the engineering date. *Emsco Manufacturing Co.*

Check No. 20 On The Time Saver Card

●

Production, Drilling, and Servicing Tools, a four-page folder, lists the products of a manufacturer of specialty products for specific divisions of the petroleum industry. Among other products illustrated are: cleanout taps and dies for rods, tubing, and slush pumps; back-pressure regulator; a safety pipe gripper; snubber cages; ball and seat assemblies; overflow valves; paraffin scratcher; polished-rod lubricator; stuffing boxes, and a hub and sprocket puller. *Baird Manufacturing Co.*

Check No. 21 On The Time Saver Card

●

Chairmen's Report on the Work of the Council. This 16-page report covers the year's activity of an association of manufacturers of petroleum equipment in Britain. The association endeavors to improve manufacturing methods and the bargaining position of British manufacturers in selling petroleum equipment in the world market. This booklet reports the accomplishments of the various standing committees. *The Council of British Manufacturers of Petroleum Equipment.*

Check No. 22 On The Time Saver Card

●

Hand Torches. A new 36-page catalog covers a complete line of torches and tips for oxyacetylene cutting and welding. Every Airco standard torch and tip is listed along with the necessary mixers, extensions, adapters, and accessories that are used with the torches. Complete information is presented through carefully planned illustrations, charts, and descriptions. *Air Reduction Sales Co.*

Check No. 23 On The Time Saver Card

●

Dravo—Engineering Constructors, is the title of a new 45-page book prepared to describe the services and activities offered by Dravo's machinery-division construction department. Prepared as a photographic story, the book shows typical pipeline-pumping and compressing stations completed by Dravo. An introduction explains how the department's staff of experienced engineering-construction specialists are equipped to consummate any type of work contract. *Dravo Corp.*

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Reach for Fyr-Fyter Dry Chemical Extinguishers . . . with absolute assurance of protection performance! They're engineered to PERFORM with "Sealed-In" power that's harnessed in perfected air-tight, water-tight sealing to provide fast, positive, fire-fighting action . . . *without fail!* The simple, squeeze-grip nozzle control releases a thrust of force that's SURE . . . expelling a long-range, heat-shielding, flame-smothering stream of free-flowing chemical powder. On contact, the flame-smothering powder puts out fires in gasoline, petroleum products, paint, varnish, lacquer, turpentine, alcohol . . . *all flammable liquids, gas, butane, propane, chemical and electrical fires!* Stainless steel tank and aluminum castings provide extra strength for more rugged use, and less weight for easier handling.

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EQUIPMENT MEN . . . in the News

Gaso Pump Names Lufkin As Rocky Mountain Distributor

Gaso Pump & Burner Manufacturing Co., Tulsa, has appointed Lufkin Foundry & Machine Co. as distributor

BOB MILLER

ROY LILLEY, JR.

for Gaso pumps in the Rocky Mountain area. Lufkin headquarters are at Casper, Wyo., where Bob Miller serves as division manager and Roy Lilley, Jr., is in charge of sales and service.

Sales and service facilities are also

JACK READ

G. W. NICHOLS

maintained at Williston, N. D., and Sterling, Colo., under the direction of Jack Read and G. W. Nichols. A complete stock of repair parts for all Gaso pumps is carried at the Casper headquarters.

Rig Maintenance Undergoes Extensive Reorganization

Rig Maintenance Supply Co., of Houston, is now undergoing an extensive reorganization of its sales and service departments, officials of the company have announced.

The newly reorganized service company will offer complete field and shop repair services for drillers in the Gulf Coast area with an adequate rig repair, supply, and service organization keyed to give speedy emergency and maintenance service. Shops and service trucks will be staffed with specialists in diesel and block repairs.

Officers of the company are: L. M. Bracewell, president; F. L. Ginn, vice president and service manager; R. S. Jackson, sales manager; and N. J. Jackson, secretary-treasurer.

Gar Wood Centralizes Sales Supervision

E. F. Fisher, president, Gar Wood Industries, Wayne, Mich., has announced a broad sales reorganization program centralizing the sales and marketing functions of all divisions of the corporation and of National Lift Co., a subsidiary.

E. B. HILL

E. B. Hill, vice president, is now appointed director of sales, advertising, and export for all corporation products. Division sales managers, who formerly headquartered at plants, will now report directly to Hill.

Hill started with Gar Wood in 1926 and has had broad experience in all phases of the company's business. He became a vice president of Gar Wood Industries in 1949.

Gray Tool Creates Market Research Department

Dan Christopher has been named marketing manager of the newly created market research department of Gray Tool Co., according to E. F. Hill, president.

D. CHRISTOPHER

Christopher is a mechanical engineer, and has a background of 20 years' experience in oil refinery and oil field work. He comes to Gray from Houston engineering office of Foster Wheeler Corp., where he was assistant engineering manager.

Christopher's work at Gray Tool will be particularly with the company's new Graloc connection. This product was introduced at the International Petroleum Exposition last year on well head control units, and is now to be offered as a universal pipe connection for refineries, chemical plants, and pipeline service.

McCullough Holds Eastern Division Conference

Officials of McCullough Tool Co.'s Los Angeles headquarters met in Houston recently for a conference with Eastern Division department heads and executives. Many ideas were presented and exchanged which will lead to improved tools and methods.

Highlight of the trip was an educational day spent at Houma, La., where the group studied operations from the new McCullough barge on the Texaco lease at Lake Pelto. The visit was especially interesting since McCullough crews were in the process of logging and perforating the offshore Texaco well on Texaco's drilling barge "Chandler".

Los Angeles and Eastern Division personnel of McCullough Tool Co. pose aboard McCullough Tool's new barge used in Louisiana for offshore duty. Standing: Bill Perkins, N. E. Erwin, Bob Smith, Dick Casterline, Jack Marler, W. S. Reynolds, Herman Schaller, J. J. McCullough, H. E. Hester, D. J. Hall, and John Cooper. Kneeling: K. K. Campbell, O. E. Petty, A. D. Beman, M. L. Van Wagner, Edward Zareh, and John George.

G. S. I. Establishes Foreign Geophysical Affiliate

Cecil H. Green, president of Geophysical Service Inc., has announced the establishment of an associate company for the conduct of geophysical exploration operations in Europe, Asia, and Africa.

The new company is Geophysical Service (Nederland) N. V., with headquarters in The Hague, Holland. Both companies are wholly owned subsidiaries of Texas Instruments Inc.

Curtis H. Johnson, a past president of the Society of Exploration Geophysicists and a widely known authority on marine seismograph exploration, is resident director of the new G. S. I. company. F. J. Agnich, executive vice president of Geophysical Service Inc., is managing director.

Walworth Makes Belz Chief Executive Officer

Fred W. Belz, executive vice president of Walworth Co., manufacturers of valves, pipe fittings, and pipe

F. W. BELZ

A. J. EICHLER

wrenches, has been elected chief executive officer of the company and chairman of the executive committee, according to an announcement by the board of directors. Alfred J. Eichler resigned as president and has been elected chairman of the board of directors.

Belz, who joined the company in 1917, has held various positions within the organization including comptroller, treasurer, and vice president. He has been a director since 1949, and a member of the executive committee of the board since March 1953.

Stone & Webster Names New Construction Manager

E. J. Ford has been named a construction manager of Stone & Webster Engineering Corp., T. C. Williams, executive vice president, has announced. Ford will have offices at company headquarters in Boston. He has been with Stone & Webster 31 years.

Ford has been general superintendent for the last 6 years of Stone & Webster projects for Gulf States Utilities Co., where he was in charge of construction of central steam power stations, transmission lines, substations, and other buildings throughout Texas and Louisiana.

He was superintendent in the conversion, 1946 to 1948, of the Los Angeles electrical system from 50 to 60 cycles. During World War II he was electrical supervisor and superintendent at Oak Ridge, Tenn., and on steam power station construction in Saudi Arabia.

Changes Made in American Iron Sales Department

The following changes and additions have been made in the sales department of American Iron & Machine Works Co., Oklahoma City.

ANDY PULLEN

Joe Thompson has been promoted to district manager in Canada. He will move in the immediate future from Great Bend, Kans., to Edmonton, Alta., Canada.

Guy W. Tucker is being transferred from Edmonton to Illinois as district manager. Herman Lawson has been promoted to district manager of the North Texas sales area, and is in the process of moving from Longview to Wichita Falls, Tex.

Andy Pullen is being transferred

JOE THOMPSON

G. W. TUCKER

from Wichita Falls, Tex., to the Gulf Coast area. His headquarters will be in Houston. Glen Severs, of the Houston

H. LAWSON

D. BEACHUM

office, has been named division manager of the Gulf Coast sales area.

W. T. (Dusty) Biddle, district manager of the Rocky Mountain area, has moved his headquarters from Casper, Wyo., to Denver. K. E. (Stumpy) Wood

GLEN SEVERS

W. T. BIDDLE

has been moved from Denver to Sterling, Colo.

David Beachum has recently been added to the sales department and will make his headquarters at Longview, Tex. Beachum was formerly with Foster Cathead Co. Jack Fuller has been added to the sales department as sales representative with headquarters in Hobbs, N. M. He was formerly in sales work with National Supply Co.

K. E. WOOD

JACK FULLER

Henley Joins Rives-Dyke As An Account Executive

The appointment of Claude Henley as an account executive has been announced by Rives, Dyke & Co., Houston advertising agency.

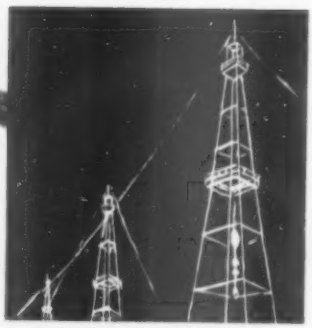
Henley comes to Houston from Kansas City, Mo., where he was assistant advertising manager of Sheffield Steel Corp. for 9 years. Henley worked as a reporter on daily and weekly newspapers in Missouri after receiving a bachelor of arts in journalism from University of Missouri in 1940.

Welex Makes G. C. Crowley Victoria District Manager

George C. Crowley, Jr., has been named the Victoria, Tex., district manager of Welex Jet Services, the Fort Worth oil-well service company that originated jet perforating, has announced.

Crowley, who has been with Welex for 3 years, has 5 years of oil-field experience. He was recently transferred to Victoria from the Welex Corpus Christi, Tex., district where he had been a sales engineer for the company.

OIL



Oil is the basic raw material of modern industry. To live without oil would mean that we would have to revert to the age of the mail coach, the Montgolfière, and the sailing ship. Only by means of the revolutionary invention of the Mannesmann pipe has it become possible to win oil from far below the earth's surface. Depths of 15,000 feet and more have been reached with the aid of Mannesmann seamless steel pipes. The stresses which these pipes have to bear, especially the casings, are extremely high. Mannesmann special casings for oil drilling have proved their reliability in oil fields throughout the world. Mannesmann supplies pipes, containers, apparatus and accessories of every type for the extraction, refining, transport and storage of oil and its by-products.

MANNESMANN-EXPORT GMBH DÜSSELDORF

EXPLORATION

"D-J"—Bright Star of the West

by Frank J. Gardner

THE sparkling success record in the Denver-Julesburg basin for 1954 is reflected by the galaxy of stars on this map—every star is a new field opened since January 1. There are 51 of them.

Consequently, "old spoon-shape" is dominating the exploration scene in the Rocky Mountains today, and promises to do so for some time to come. Actually, it is still in the initial stages of development, but with new outlets, continued rapid and widespread wildcatting, and a little added encouragement from its deeper reservoirs, "D-J" is likely to overshadow many another basin province during the next few years.

Plus factors . . . No other comparable area in the United States is up to this basin's 1954 record of 1,035 completed wells. This means that 42 per cent of all present drilling activity in the Rocky Mountain region is centered within its boundaries. Today, it produces 80,000 bbl. of oil per day from 130 fields; that's an increase of 1,300 per cent during the past 5 years.

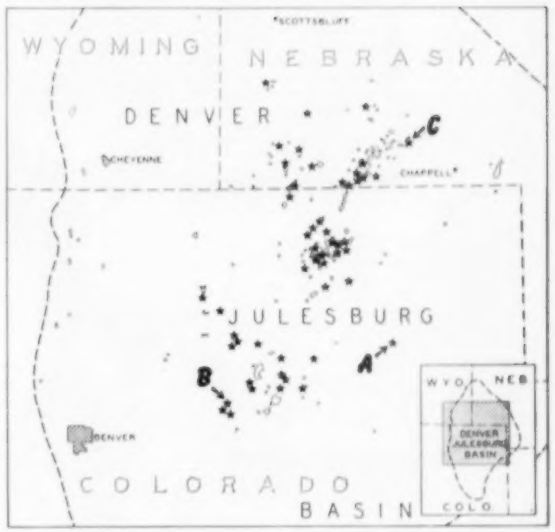
Why? The reasons are plentiful: shallow depths, easy digging, multiple-pay prospects, ready outlets, available farmouts, quality crude, and $3.00 drilling costs. Few places offer all these in one package today. As a result, independent operators have flocked to Denver-Julesburg. As usual, when independents congregate, they've found fields. As always, oil has begotten oil.

Minus factors . . . On the darker side, there are numerous negative factors to be considered in appraising the basin. None is particularly foreboding, but each one merits the attention of those who would predict its future course.

Oil fields in the basin depend upon both structural and depositional conditions; structural expressions are more Mid-Continent than Rocky Mountain, and minimum low-relief structure is the rule. Sand occurrence is eccentric, and in order to have a field, structure and sand must coincide; most Denver-Julesburg fields are therefore limited in areal extent. There are only two really large fields to date—these are Adena and Little Beaver.

Farmout deals, once the beckoning hand to independents, are reportedly becoming harder to find, as the larger leaseholders lean more and more toward processing their own acreage. Too, substandard crude prices based on a difficult transportation cost item, are discouraging, but this is gradually being relieved.

A 28 per cent development dry-hole ratio has also been discouraging; this springs, of course, from the erratic sand development, but as more subsurface knowledge is gleaned from the widespread drilling campaigns, it is expected to be reduced to some extent. On the other hand, exploratory dry holes are not above the national average; about one in seven is the rule.



Each star represents a 1954 discovery for Denver-Julesburg; A, B, and C are the most recent extensions.

Present factors . . . At this time, most Denver-Julesburg fields produce from the "D" and "G" sands of the Dakota (Upper Cretaceous) series, and from the "J" sand of the Lower Cretaceous. Two fields (Black Hollow and Keota, both in Weld County, Colorado) have found Lyons sand (Permian) production, but the search for these deeper pays elsewhere has been unrewarding. Producing depths in Cretaceous sands vary from 3,500 ft. on the eastern flank of the basin to 8,400 ft. in southeastern Wyoming. The Permian production at Black Hollow comes from 8,930 ft. and at Keota from 8,500 ft.

Future factors . . . There is little doubt that Denver-Julesburg is on the threshold of an intense period of exploration that will dwarf its present drilling programs, in impact if not in numbers. A vast area lies relatively unexplored, in every direction away from the present clustering of fields. It must be surveyed, shot, and drilled areawise and depthwise, and in the process, many another field is going to be discovered.

There are two chief reasons for optimism over this area: (1) the continued growth outward of the producing area, and (2) the promise of deeper production to come. The past week, two new discoveries, at A and at B on the map, have pushed production farther to the east and west; others in Nebraska (C on map) have pushed it northward. No doubt, coming weeks will see additional stepouts; in an area the size of this one, it must be remembered that a discovery such as that at A brings thousands of acres into discovery focus between A and C.

Cretaceous rocks aggregating 17,000 ft. in thickness lie within reach; Permian beds from 500 to 2,500 ft. thick underlie these, and Pennsylvanian rocks up to 4,000 ft. in thickness offer further potentialities. Between the eastern flank of the basin and its western "deep" aligned between Denver and Cheyenne, the pre-Cambrian basement complex displays 20,000 ft. of structural relief. Within the basin limits, a myriad of undiscovered oil traps must lie concealed. "D-J" is the bright star of the west.

THE JOURNAL REVIEWS . . .
EXPLORATION ACTIVITY IN JULY
A Peace River region gas well in British Columbia recorded the largest flow ever reported in that area. Pacific Petroleums, Ltd., and Associates 23 Fort St. John recorded an absolute calculated open-flow potential of 71,000 M.c.f. per day from the Permo-Pennsylvanian.
The second producer from the Cherokee sand in Northwest Eva field was completed in Texas County, Oklahoma. . . . A Permian brown dolomite strike was made on the southern flank of the granite ridge that separates the Texas Panhandle into two basins. . . . A multiple-pay Pennsylvanian discovery was made in Hansford County, Texas. . . . The largest gas well ever completed in the Oklahoma Panhandle was reported in Texas County. . . . An important dual-pay discovery was completed in Ochiltree County, Texas.
The first Wilcox (Ordovician) sand oil production in Nebraska was opened in the southeastern Nebraska portion of the Forest City basin. . . . A multizone discovery well in Grady County, Oklahoma, got that state's deepest oil production. . . . One of the best oil fields in southwestern Kansas is developing rapidly as the result of excellent extension success on the northeast flank of Harper's Ranch in Clark County.
A West Texas operator got his third consecutive deep Ellenburger discovery in the area west of Andrews. . . . A deep wildcat on the western flank of the Central Basin platform in Winkler County found gas-condensate prospects in the Devonian rocks at 9,000 ft. . . . The largest gas well yet has been completed in Puckett-Ellenburger field, Pecos County. . . . Devonian pay was added to Puckett field in Pecos County.
What appears to be Mississippi's best deep oil discovery to date opened first production in Hinds County. . . . The first commercial oil discovery on the Texas Continental Shelf since the federal tidelands decision last year was made 23 miles southeast of Corpus Christi. . . . Another Gulf of Mexico oil pool was opened 4 miles off the coast of St. Mary Parish in Louisiana's Eugene Island area.

Mississippi Gets Major Oil Discovery

by John C. McCaslin

JULY'S exploratory developments were overshadowed by a major oil discovery in Hinds County, Mississippi. However, other areas in the nation and in Canada reported "firsts" and "largests." Important strikes were made in the Mid-Continent region, British Columbia, the Gulf Coast, West Texas, and the Hugoton embayment.

The month's total completions were up 22 per cent over the June figures, setting a new drilling record at 5,148 wells. Cumulative completions for 1954 stand at 31,052 wells compared to 27,854 this period last year. Wildcat completions were up 7 per cent over the previous month, but cumulative figures lag slightly under 1953 totals.

Mississippi . . . What is probably the best oil discovery in the state in many years opened first oil production in Hinds County, 12 miles northwest of Jackson.

Larco Drilling Co. 1 McAlpin et al flowed 748 bbl. of oil per day on 16/64-in. choke from the Paluxy sand section at 9,920 ft. The discovery is of considerable importance to the future of Lower Cretaceous exploration in Mississippi. The well had the biggest initial flow of any Lower Cretaceous well in the state's history. There are only three fields in the state that have more than one Lower Cretaceous well on production. They are: Soso, Hiwannee, and Virlillia. The Paluxy is in the upper part of the Trinity Group, leaving the highly productive Glen Rose formation yet to be tested at the discovery.

New Bolton field lies on the eastern limb of the Big Black River syncline, off the west flank of the Jackson dome. This dome is the largest local structure in the state. The only other production in this area has been at Jackson dry gas field, now virtually abandoned.

Mid-Continent . . . Nemaha Oil Co. opened first Wilcox (Ordovician) oil production in Nebraska in the Forest City basin.

The C-2 Miles, 4 miles south of Dawson in Richardson County, swabbed oil at the rate of 480 bbl. per day. The well had three other producing zones above the Wilcox . . . the Hunton, Viola, and Simpson dolomite.

Oklahoma got its deepest oil production at Phillips Petroleum Co. 1 Steve in Grady County's Bradley field. The multizone discovery well flowed at the rate of 728 bbl. of oil per day from perforations at 13,735-13,804 ft. in the Oil Creek sand, opening first Oil Creek production in this area of Oklahoma. The deep production being established and developed in the Bradley area highlights southwestern Oklahoma activity.

Gulf Coast . . . Standard Oil Co. of Texas made the first oil discovery off the Texas Gulf Coast since settlement of the tidelands dispute.

The strike is located 23 miles southeast of Corpus Christi. It flowed 214 bbl. of oil per day from an upper Frio sand section at 7,760 ft.

In Louisiana, 4 miles off St. Mary Parish in Eugene Island, Shell Oil Co.

Total July Completions, Exploration and Development

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Active operations
Ala.-Ga.-Fla.	13	0	0	13	3	3	6	1	0	0	66,161	11
Arkansas	65	31	0	34	14	39	10	2	0	0	227,718	51
California	187	130	7	50	38	64	50	18	13	4	961,484	229
Colorado	139	50	5	84	2	30	103	4	0	0	750,783	110
Illinois	281	170	0	111	116	165	0	0	0	0	685,104	442
Indiana	82	32	3	47	72	10	0	0	0	0	128,424	101
Kansas	468	233	43	192	39	416	13	0	0	0	1,623,889	457
Kentucky	108	43	22	43	84	24	0	0	0	0	207,410	123
Louisiana	333	219	37	77	123	24	43	66	54	23	2,010,101	418
North	185	134	21	30	123	18	23	18	3	0	538,548	164
South	148	85	16	47	0	6	20	48	51	23	1,471,553	254
Michigan	38	10	0	28	24	14	0	0	0	0	86,771	139
Mississippi	27	8	1	18	0	2	14	7	4	0	208,198	42
Montana	36	18	2	16	13	14	4	4	1	0	148,644	62
Nebraska	33	16	2	15	0	5	28	0	0	0	192,134	59
New Mexico	142	50	78	14	20	62	47	7	2	4	679,092	102
New York	26	13	0	13	26	0	0	0	0	0	46,800	30
North Dakota	38	23	0	15	1	12	2	23	0	0	244,183	42
Ohio	112	49	28	35	68	43	1	0	0	0	218,097	187
Oklahoma	977	591	40	346	432	401	92	44	6	2	3,061,770	1,207
Pennsylvania	137	39	41	57	84	7	45	1	0	0	479,679	153
South Dakota	2	0	0	2	0	0	1	1	0	0	16,769	1
Texas	1,721	1,042	64	615	469	622	407	159	49	15	7,711,755	1,145
N. Central (7-B & 9)	695	419	2	274	313	267	113	2	0	0	2,209,551	236
West (7-C & 8)	438	327	7	104	64	143	132	63	22	14	2,449,789	383
Panhandle (10)	81	55	14	12	3	75	2	1	0	0	269,047	46
East (5 & 6)	105	36	23	46	23	28	46	8	0	0	513,011	79
Gulf Coast (2 & 3)	202	104	13	85	15	42	66	60	19	0	1,338,989	208
Southwest (1 & 4)	200	101	5	94	51	67	48	25	8	1	931,368	193
Utah	4	1	0	3	1	3	0	0	0	0	13,743	41
West Virginia	54	7	39	8	25	27	2	0	0	0	153,319	171
Wyoming	124	92	1	31	8	30	75	6	5	0	708,547	198
Miscellaneous	§1	0	0	1	0	1	0	0	0	0	3,910	¶17
Total July 1954	5,148	†2,867	413	*1,868	1,662	2,018	943	343	134	48	20,634,485	‡5,532
Total June 1954	4,205	2,298	359	1,548	1,345	1,607	744	293	134	52	17,532,157	5,665
Cumulative 1954	31,052	17,449	2,263	11,340	9,539	12,227	5,793	2,245	903	345	127,432,939	
Cumulative 1953	27,854	14,442	2,162	11,250	8,342	11,607	4,845	2,023	797	240	113,544,428	
Western Canada:												
Alberta	100	52	12	36	14	34	44	6	2	0	480,119	
Saskatchewan	106	56	7	43	38	59	8	1	0	0	322,225	
Manitoba	22	16	0	6	13	9	0	0	0	0	56,922	
B. C.-N.W.T.	2	1	0	1	0	1	0	1	0	0	12,355	
Cumulative 1954	1,150	656	78	416	276	499	311	56	7	2	4,657,728	

*Incl. 102 service wells: Calif. 1, Kans. 4, N. Y. 13, Ohio, 5, Okla. 38, Pa. 39, N. Tex. 1, S.W. Tex. 1, †Incl. 45 condensate wells: S. La. 11, Miss. 3, N. M. 1, Okla. 9, W. Tex. 1, Gulf Coast 16, S.W. Tex. 4. ‡Includes all wells rigged up and/or drilling at month's end. §Incl. Wash. 1. ¶Incl. Md. 3, Idaho 1, Nev. 7.

. . . and the Month's Wildcats

	Total	Oil	Gas	Dry	Footage	1954 Comp.	1954 (1,000 ft.)	1953 Comp.	1953 (1,000 ft.)
Ala.-Ga.-Fla.	13	0	0	13	66,161	62	344	63	330
Arkansas	18	3	0	15	72,275	83	347	72	249
California	39	2	1	36	201,386	344	1,697	375	1,876
Colo.-Utah-Wyo.-Mont.	100	7	3	90	555,680	548	3,116	353	2,017
Tri-States	37	2	2	33	64,855	405	774	562	1,115
Kansas	78	8	2	68	310,146	411	1,606	537	2,021
Louisiana	55	13	4	38	487,192	301	2,825	280	2,483
North	18	1	1	16	106,556	87	514	81	462
South	37	12	3	22	380,636	214	2,311	199	2,021
Michigan	17	1	0	16	36,977	144	320	147	354
Mississippi	10	0	0	10	69,882	89	610	124	886
Nebraska	13	2	0	11	73,609	81	427	99	504
New Mexico	16	2	6	8	54,854	95	677	85	552
North Dakota	15	1	0	14	60,153	59	310	36	220
Oklahoma	90	10	4	76	347,892	464	2,014	468	1,988
South Dakota	2	0	0	2	16,769	11	66	8	40
Texas	469	87	7	375	2,305,764	3,055	15,151	3,155	15,353
North Central	206	46	0	160	761,460	1,234	4,349	1,294	4,607
West	91	21	2	68	562,462	580	3,511	498	2,895
Panhandle	8	1	0	7	40,905	52	296	18	97
East	30	0	1	29	121,605	180	946	184	900
Gulf Coast	70	12	4	54	502,874	490	3,647	538	3,851
Southwest	64	7	0	57	316,458	519	2,402	623	3,003
Others	10	0	3	7	49,745	81	344	60	228
Total July 1954	982	138	32	812	4,773,340	6,233	30,628	6,424	30,226
Total June 1954	917	134	46	737	4,602,008				
Cumulative 1954	6,233	899	211	5,123	30,627,566	6,233	30,628		
Cumulative 1953	6,424	937	233	5,254	30,225,816			6,424	30,226
Western Canada	82	7	11	64	376,754				

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POST OFFICE BOX 1331 • DALLAS, TEXAS,

State Lease 1667 flowed at the rate of 440 bbl of oil per day from Miocene sand. The discovery is 4 miles northeast of Pure Oil Co.'s Eugene Island Block 32 field, opened in 1949.

West Texas . . . Ralph Lowe got his third consecutive Ellenburger discovery this year in the area west of Andrews at 1 Sloan.

The flush Ellenburger strike gaged 151 bbl. of oil in 1 hour on its second drill-stem test. Lowe's three discoveries in this area are about 3 miles apart on a northwest-southeast trend, suggesting the same deep Ellenburger structure. This record of wildcat success is a "first" for any Permian basin operator.

In Winkler County J. C. Barnes and C. V. Lyman 1 Kerr, in old Emperor field, promised to be a big Devonian gas-condensate discovery on the west flank of the Central Basin platform. The strike is along the sand-belt trend that extends from Hobbs to Pecos Valley field, a distance of about 140 miles. Few deep tests have been drilled along this old trend. Successful completion of the 1 Kerr should step up the deep drilling campaign in the area where a vast belt lies undeveloped in basal Permian sands and limestones and below the Permian-Pennsylvanian unconformity.

Phillips Petroleum Co. drilled a 1½-mile northeast stepout from its Puckett field discovery in Pecos County and completed the biggest well for the field at 1 Odom "C". It was rated for an open flow potential of 240,000 M.c.f. of gas per day from open hole in the Ellenburger at 13,674-14,775 ft. Later in the month Phillips got Devonian gas production in the field at 1 Evelynjo, on the north side of Puckett. This discovery flowed at the rate of 26,417 M.c.f. per day from 10,740-10,860 ft.

Hugoton embayment . . . United Carbon Co., Inc., 5 Kelley, Northwest Eva field, Texas County, Oklahoma, made potential flow of 285 bbl. of oil per day through ¼-in. choke to become the second Cherokee (Pennsylvanian) sand oil well in the field. It offsets the Cherokee discovery well made at Gulf Oil Corp. 1 Hixon.

Cabot Carbon Co. 1 Baker, 3 miles northwest of Alanreed, Tex., and 1 mile southeast of nearest production, flowed 5,000 M.c.f. of gas per day to become an important geological wildcat discovery on the southern flank of the Amarillo uplift.

In hot Hansford County, Texas Panhandle, Colorado Oil & Gas Co. and R. H. Fulton 1 Steele got gas pay in three different Pennsylvanian zones . . . the Tonkawa, Oswego, and Atoka. R. H. Fulton 1 Jackson, 9 miles to the southwest of the three-pay 1 Steele, flowed an estimated 10,000 to 12,000 M.c.f. of gas per day from the Atoka. Ochiltree County came into the Pennsylvanian play in the Panhandle with a dual discovery at The Texas Co. 1 Daniel "A," 9 miles south of Waka.

The Oklahoma Panhandle got its biggest gas well yet at American Gas Producing Co. 1-A Squires in the Camrick gas area, Texas County. The well was potentialed for a calculated open flow of 150,000 M.c.f. of gas per day from Morrow sand perforations.

TEXAS

NORTH TEXAS

New Pay Zones Opened In Grayson, Stonewall Counties

L. O. McMillan 1 Foster, Oil Creek sand test 5½ miles north of Whitesboro in western Grayson County, swabbed some oil from the lower formation but has been plugged back and completed as a good flowing well from the Strawn.

Final perforations were from 6,407-12 ft. and potential was 336 bbl. daily through ¼-in. choke. Tubing pressure was 275 psi. Gas-oil ratio was not reported. Operators drilled into the Oil Creek sand at 7,366 ft. and had total depth at 7,395 ft. Fracture treatments of the sand section yielded up to 70 bbl. of oil a day, swabbing. Location is about 1½ miles southwest of Sandusky field production.

Lone Star Producing Co. will drill 1 Charles O'Hagan as a 11,000-ft. wildcat 5 miles west and slightly north of the town of Sherman, in Grayson County. Location was reported to be in the J. S. Coffee Survey, A-232, which is about 2 miles west of present production.

Seaboard Oil Co. 4 Upshaw, 61-D-H&TC Survey, has added Canyon sand pay to the Upshaw field area which currently produces from the Caddo and the Bend sections. No. 4 Upshaw pumped 45.5 bbl. of oil a day, plus 22 per cent water, from pay between 4,476-86 ft.

Lone Star Producing Co. 1 Ruby Green, 7 miles north of Aspermont and southwest of the Gloria Gay conglomerate field, has been completed as a Caddo pumper. Potential was 40 bbl. of oil a day from pay at 6,093-6,106 ft.

Montague County . . . Elkins & Marshall 1 Slaughter, ¾ mile northwest of McNutt field, completed for 368 bbl. of 44° oil a day, flowing through 20/64-in. tubing choke, from pay between 5,932-6,007 ft. Tubing pressure was 650 psi. and gas-oil ratio was 540 cu. ft.

TEXAS GULF COAST

Tidelands Activity Report

Three Gulf of Mexico drilling ventures were below 8,000 ft., and one major company was preparing to move three offshore-platform sections 7½ miles into the tidelands in preparation for wildcat drilling.

Gulf Oil Corp. had drilled to a total depth of 8,548 ft. on August 17 at its 1 State Tract 692, a projected 12,000-ft. wildcat on Block L-774, 8½ miles from the shores of Mustang Island, Nueces County, South Texas. The company is using a template-type platform standing in about 60 ft. of water, and it is being served by a specially designed tender, converted from an L.S.T.

Standard Oil Co. of Texas, discoverer of the first and only commercial oil production on the Texas tidelands, was drilling below 8,530 ft. at its 56 State Tract 948, about 1½ miles from Padre Island, Kleberg County. The well is the second drilled from the permanent platform, and is being drilled directionally. Target is 10,000 ft.

Humble Oil & Refining Co. was scheduled to log to 8,455 ft. on its 1 State Tract 692, a proposed 12,000-ft. test on state-owned tidelands off Aransas County, about 14½ miles northeast of Port Aransas. Last week the test had earlier attached mud logger at 8,272 ft.

Sun Oil Co., in the meantime, reported it has abandoned one of its state-owned-tidelands area tests as a dry hole. Its 1 State Tract 1,018, off Kenedy County about 27 miles east of Sarita, was plugged at 9,209 ft., where 5½-in. was set. Marginulina sand perforations from 8,930-38 ft. yielded only salt water.

Magnolia moving out . . . Three offshore-platform sections are to be moved out into the Gulf of Mexico 7½ miles, one of them 256 ft. long by 52 ft. wide.

The structures are to be moved from Magnolia's new marine base at Sabine Pass, and a wildcat will be drilled off Jefferson County, on state-owned lands. Spud-in date has been set for about September 1.

In addition to the main derrick section, there are a 35 by 75-ft. platform for storage of pipe and other equipment, and another unit 40 by 46 ft., which will serve for the crew's quarters. The three will be integrated into one on location, which is about 12 miles southwest of Sabine Pass in about 36 ft. of water.

Magnolia announced in June that it would drill its initial wildcat test off Jefferson County in the far-western portion of Block 10. The spot location is 5,940 ft. from the south line and 660 ft. from the west line of the tract.

The company reports the platform deck will be 35 ft. above water level, and if the initial 13,000-ft. test is successful, the rig will be skidded to each of the four remaining locations, and directional wells drilled.

The structure will be supported by 94 22-in. pilings, and will measure an over-all 400 ft. from end to end.

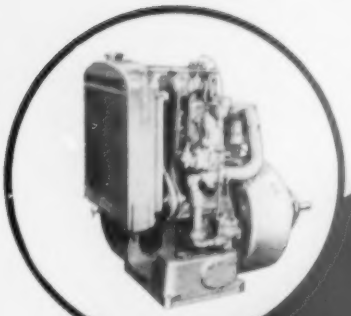
Nearest production to the drilling site is Clam Lake field, northwest about 2 miles inland in Jefferson County.

WEST TEXAS

Flush Devonian Discovery For SW Terry County

Week's exploration developments brought in another Devonian discovery. This one is in southwestern Terry County, 30 miles from similar production. See news section this issue.

Anderson-Prichard Oil Corp. 1 Oil Development Co., 7½ miles northwest of the town of Wellman in SE NW 152-D11-J. H. Gibson Survey, flowed 137.7 bbl. of oil in 1½ hours on a drill-stem test covering a section that included the first 47 ft. of the Devonian. Top of the Devonian by samples was 12,750 ft., minus 9,424 ft. A 2-hour test from 12,681-12,797 ft. using 2,525 ft. of water cushion, flowed the water blanket in 28 minutes, mud in 35 and oil in 50 minutes. It was cleaned into pits for 30 minutes, then turned to tanks where it flowed 56.7, 45.9 and 35.1 bbl. of 34°



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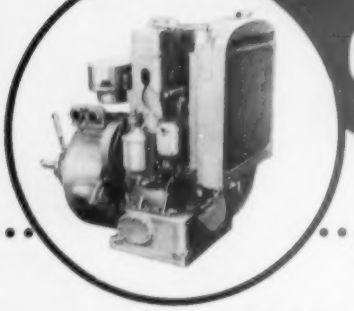

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oil on three 30-minute gages. Choke sizes were not reported. Flowing pressure ranged from 460-5,360 psi., and 15-minute shut-in pressure reached 5,440 psi.

Location of the new find is 30 miles due east from Hunt Oil Co. 1 Johnson, Devonian discovery in Yoakum County, and about the same distance from Devonian wells in the Russell field of northwestern Gaines County. The latter field has had extensive Devonian development drilling throughout the central portion, which is surrounded with Clear Fork producers.

Last week Hunt 1 Johnson flowed 15-20 bbl. of oil an hour on drill-stem test of the Devonian. At last report, after perforating from 11,438-11,475 ft., the well flowed 292 bbl. of fluid, cut 38 per cent with mud, in 16 hours through ¼-in. choke. Following that it made 88 bbl. of oil in 4 hours through ¼-in. choke, cutting 12 per cent water and mud. At this report the well had not been acidized.

Midland County . . . British-American Oil Producing Co. 1 Roy Parks, Jr., 1-mile southeast extension to Headlee field, has made a heavy flow of oil from the Ellenburger. Operators drilled into the Ellenburger at 13,056 ft. on elevation of 2,850 ft., then drill-stem tested from 13,050-13,135 ft. Gas surfaced in 14 minutes and oil in 32 minutes. On ⅝-in. bottom and 1-in. top chokes, the well gaged 85 bbl. of oil an hour for 2 hours, with no water. Flowing pressure ranged from 3,850-4,800 psi. Operators drilled ahead.

Coke County drilling program . . . Perkins-Prothro Co., Wichita Falls, has filed application to drill 11 wells on the J. Willis Johnson estate, 20 miles northwest of Robert Lee. Applications call for 7,000-ft. tests, classed as extension trys to the Fuller-Coke Strawn field.

MICHIGAN

Edward Torosian 1 Nerreter, SE SE NE 2-1s-7e, Salem Township, Washtenaw County, continued to hold the top interest in the Northville area and in Michigan this week as well was reported to be flowing oil at a restricted rate of 23 bbl. of oil an hour from the Trenton after a small 270-gal. mud acid clean-out shot.

The 1 Nerreter, first oil well for Section 2, Salem Township, is the deepest, on a basis of penetration and a sub-sea minus, of any well in the Northville pool development. Well is about 1½ miles northwest of the W. C. Taggart 1 LeMaster Trenton oil discovery well in the same general area. The Torosian 1 Nerreter first won fame and distinction in the Northville pool development when it drilled an estimated 11,000-M.c.f. cu. ft. gas pay in the Trenton at about 4,317 ft. After several weeks of fruitless effort to kill well so hole could be deepened with cable tools, a rotary was moved in and well was cored in the Trenton from 4,317 ft. to 4,551 ft., present depth. Top of Trenton was logged at 4,095 ft. It was in the course of this coring, and afterwards, that well won its greatest claim to fame as a Northville pool extender. It encountered an oil pay below a semilime shale break and above the water table. It confirmed the presence of a fairly uniform water table throughout the field at a point on the sub-sea of about minus 3,350 ft. This confirmation may require that many other tests in the field, which have not penetrated to about that minus point, be deepened. This new 1 Nerreter pay zone may even be an entirely new pay horizon for the pool, but only further

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drilling and study will prove or disprove this theory.

Well flowed as much as 60 bbl. of oil an hour on first tests following acid treatment in the Trenton to perforated pay zones, at 4,905-30 ft. No water was reported to be showing, although a drill-stem test, run prior to setting and cementing 4-in. casing, showed some water. Well was perforated with 84 shots above the known water level.

ILLINOIS

In White County, 2 miles west of Crossville, Slagter Producing Co. is drilling ahead at 3,187 at 1 Stokes, 21-4s-10e, after a 2-hour drill-stem test in the Cypress recovered 780 ft. of gas, 20 ft. clean oil, and 15 ft. oil-cut mud at 2,785-2,804 ft. The indicated pool opener is 1½ miles from production.

CALIFORNIA

Kettleman Deep Zones To Be Tested

After months of planning Standard Oil Co. of California, as operator of the Kettleman North Dome Unit, was preparing to start a deep test in that northern San Joaquin Valley field. The test, 423 34-J, will be located in SW 34-21s-17e, in the northern portion of the 12-mile long field. It is scheduled to start in September towards a projected depth of 14,000 ft.

The field's principal pay is the Temblor zone at a depth of about 8,000 ft. The Vaqueros sand, also of Miocene age, is encountered about 800 ft. deeper and contains some 60 producers. Deepest present pay is the McAdams sand of Eocene age, topped at about 10,000 ft. Deepest test to date was Standard E-1-1U, in 1-23s-19e, abandoned in the Cretaceous at 12,884 ft.

Ridge Route Wildcats

Another wildcat shortly will start in the little explored mountainous area south of San Joaquin Valley and north of upper Santa Clara oil fields. Green, Wheeler & Walton staked location for 1 Sycamore in 21-9n-17w, near Gorman and at an altitude of 2,800 ft. South of this wildcat Continental Oil Co. was below 2,500 ft. on a 6,500-ft. test, designated 1 McCue-U.S.L. Site of this test is in 15-7n-18w.

North La Habra Test

Erin Oil Co. resumed drilling at its wildcat 1 mile north of La Habra, eastern Los Angeles area, after a potential oil sand below 8,200 ft. tested wet. Perforated liner had been set in the test at 8,050-8,525 ft. This was pulled and a depth below 8,700 ft. had been reached at last report. Designated 1 Freedman-North La Habra, the test is located in NE 5-3s-10w, about 1½ miles south of Sansinena production.

OKLAHOMA

South Hunter Pool Has Its Second Well

The second oil well at Garfield County's South Hunter pool flowed oil in 8 minutes at the estimated rate of 5 bbl. hourly from Misener sand perforations at 6,120-48 ft.

It is Carter Oil Co.'s unit well, recovered 360 ft. of clean 35.6°-gravity oil.

Southeast Bradley Report

Production tests at two Magnolia Petroleum wells in Grady County's Southeast Bradley field are reported.

The 1 Marie Purkes, C SW SW 12-4n-5w, flowed 300 bbl. of oil in 24 hours on 24/64-in. choke from perforations at 9,376-9,434 ft. This well is in the main sector of the field in Grady County.

On the Garvin County side of the pool the 1 Johnson Hogue Unit, NE SW 18-4n-4w, kicked off and flowed 106 bbl. of new oil in 13 hours on 32/64-in. choke from Springer sand perforations at 9,254-70 ft.

North Freeny deep pool . . . Mid-Continent Petroleum Corp. 2 Lillian C. Kidwell Unit, C NW NE 23-8n-4w, on the south side of deep North Freeny pool in McClain County, south-central Oklahoma, flowed 8 to 10 bbl. of distillate per hour and 5,000 M.c.f. of gas per day. The drill-stem test was taken at 10,116-150 ft.

Carter Oil Has McClain Strike Hinted

Carter Oil Co. has an indicated deep discovery in McClain County at 1 John Neal, NW SE NW 23-6n-3w.

The indicated first Bromide sand strike flowed oil at the estimated rate of 40 to 50 bbl. per hour on drill-stem test at 9,241-72 ft. in the first Bromide sand. Operators pulled a core from 9,275-83 ft. Recovery was 11 ft. of which 2 ft. was white lime, tight with no show. Recovery on the drill-stem test was 2,450 ft. of clean oil with no water.

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This wildcat is located about 8 miles northeast of Lindsay sector deep production and about the same distance south of East Washington pool. Tops include: Woodford 8,126 ft., Hunton 8,240 ft., Sylvan 8,620 ft., and Viola 8,754 ft.

Good Wilcox Pool Opened in Garfield

Garfield County has a good Wilcox oil discovery at Weimer-Fitzhugh and Cimarron Drilling Co. 1 Baker, NW NE NW 13-22n-3w.

The first Wilcox strike flowed gas in 3 minutes at the estimated rate of 500 to 750 M.c.f. per day. It flowed oil in 24 minutes to the pits at an estimated rate of 70 bbl. in 26 minutes. The drill-stem test was taken at 5,455-87 ft.

The new Wilcox pool is located 1¾ miles northeast of Southeast Duff pool, a shallow producing area.

KENTUCKY

WESTERN KENTUCKY

F. H. Rhodes and Charlie Morburger 1 Otto Chase, 9-Q-26, Henderson County, 2 miles north of Reed, is swabbing 5 bbl. of oil hourly natural from Waltersburg (Stray) sand at 1,267-69 ft. The well is 1½ miles from production.

In Union County, George Engle 1 Cain, 2-O-18, is flowing 7 bbl. of oil per hour natural from McClosky lime at 3,001-11 ft.

EASTERN KENTUCKY

In Big Sand gas field and located on Elkins Fork in the Pike County sector, Kentucky West Virginia Gas Co. has completed 6212 Samuel J. Elkins as a Devonian black shale gas well. Open flow potential was 1,917,000 cu. ft. of gas daily from 2,760 ft. to 3,291 ft. total depth.

On Beefhide Creek, also in the Pike County sector of Big Sandy gas field, Kentucky West Virginia has completed a good Mississippian Big lime gas well. Lime, topped at 2,505 and penetrated to 2,753 ft. total depth, yielded an open flow 2,040,000 cu. ft. of gas daily with a rock pressure of 510 psi.

APPALACHIAN AREA

PENNSYLVANIA

In Salt Lick Township, Fayette County, Southwest Pennsylvania, Mid Atlantic Oil & Gas Co. is moving in a rotary outfit at 1 Adolph Dupre, at a depth of 5,100 ft. In Connellsville Township, Peoples Natural Gas Co. 4030 F. K. Buttermore, is at 6,365 ft. Monroe Township, Bedford County, John Galey 1 Donald Miller, is drilling at 4,963 ft. Parker Township, Butler County, Walker et al 1 John Walker, reached 4,285 ft. Grant Township, Indiana County, Fairman Drilling Co. 1 Herb Gernandt, is drilling at 4,688 ft.; Pine Township, Fryer & Hanson 1 Lucinda Mitchell, at 4,200 ft., and in Cherry Hill Township, Chestnut Ridge Oil & Gas Co. 3 Ralph White, shut down at 7,768 ft.

OHIO

Another Oriskany sand well was added to North Royalton pool by H. A. Dempsey et al, the 1 R. C. Gordon, Section 14, Royalton Township, Cuyahoga County. Sand was logged at 1,740-92 ft. with an open flow of 1,250,000 cu. ft. natural.

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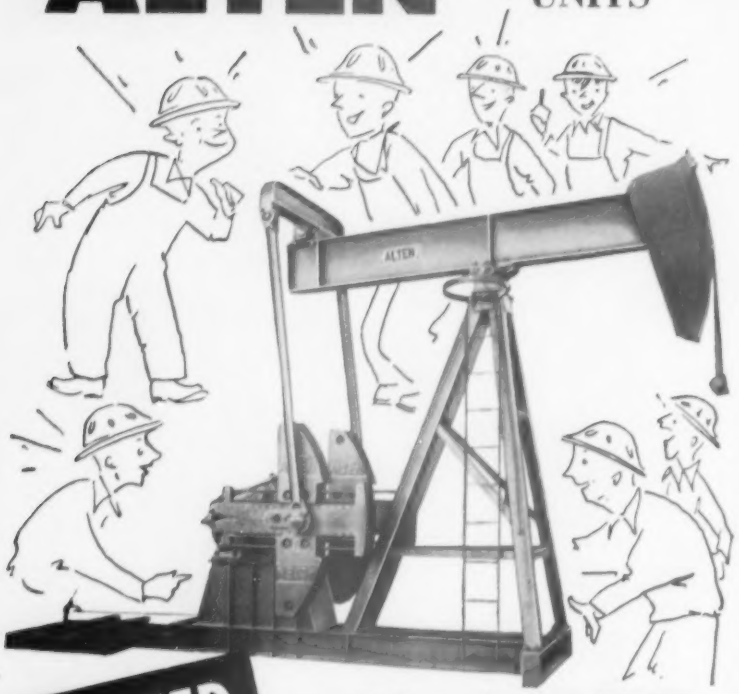

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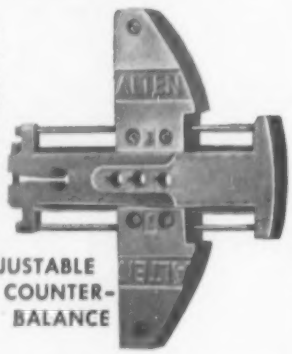

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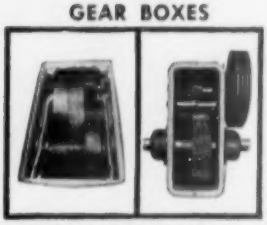

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pool was completed on 1 Mayo Denning, Lot 12, Clay Township, Tuscarawas County, by Ebersbach and Blacksten. Berea sand topped at 933 ft. gaged 2,280,000 cu. ft. natural at 987 ft., the total depth.

In Jackson Township, Knox County, two producers extended the field short distances: Mutual O & G. 1 Lake Cochran, Section 23, with Clinton at 2,957-3,005 ft. made 194 bbl. after fracturing; C. A. Davis et al 7 Edna Shouts, Section 11, made 775,000 cu. ft. gas and 50 bbl. oil after fracturing sand, found at 2,980-3,029 ft.

WEST VIRGINIA

Roaring Creek district, Randolph County, West Virginia, Seneca Gas & Oil Co., completed 1 Thomas J. Cain, wildcat, elevation 2,449 ft., as a small gas well testing 47,000 cu. t., Fifth sand 2,233-2,253 ft., T.D. 3,165 ft.

INDIANA

Log is being run at a Posey County prospect, the Coy Oil Co. 1 Allen W. Gray estate, 20-8s-14w, 10 miles southwest of Mt. Vernon. Recovery on a 2-hour drill-stem test in the Cypress at 2,280-90 ft. was 1,420 ft. clean oil. This is the fourth well in the general area.

LOUISIANA

NORTH LOUISIANA

Travis Peak Pool In Caddo Confirmed

Arkansas Louisiana Gas Co. reported that the Travis Peak pool in Rodessa field, Caddo Parish, was confirmed August 17 with the completion of its northeast offset to the discovery well.

The company's 2 Rosie Lee Parker SE¼ NW¼ Section 26-23-16, was completed to flow 16 bbl. of oil per hour through a ¼-in. choke.

Location of the confirmation test is about 1,800 ft. northeast of Union Producing Co.'s discovery well which was completed some time ago. The discovery well is located in the northwest quarter of the southeast quarter of this section.

Production was from perforations at 6,836 ft. in the formation. Gas to oil ratio was 650:1, the well's flowing pressure was 580 psi., the gas company said. The Rosie Lee Parker test was spudded on July 1.

Drillers tested one other zone at a slightly higher level than the sand in which the confirmation well was completed, but production prospects appeared to be meager, the company said.

The company reported that it has a second confirmation test currently drilling in this field.

SOUTH LOUISIANA

Orange Grove Field Gets New Oil Pay in Terrebonne

The 3 Keenan, completed by Shell Oil Co. on the northwest side of Orange Grove field in Terrebonne Parish, is a new oil pay discovery well.

The well flowed 243 bbl. of 31.7°-gravity oil per day through 8/64-in. choke. Perforations were at 19,585-88 ft. Gas-oil ratio is 1,827:1. It is located in 85-17s-16e.

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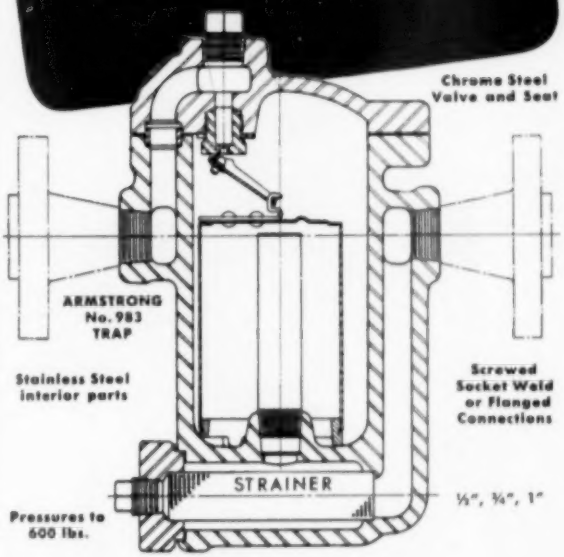

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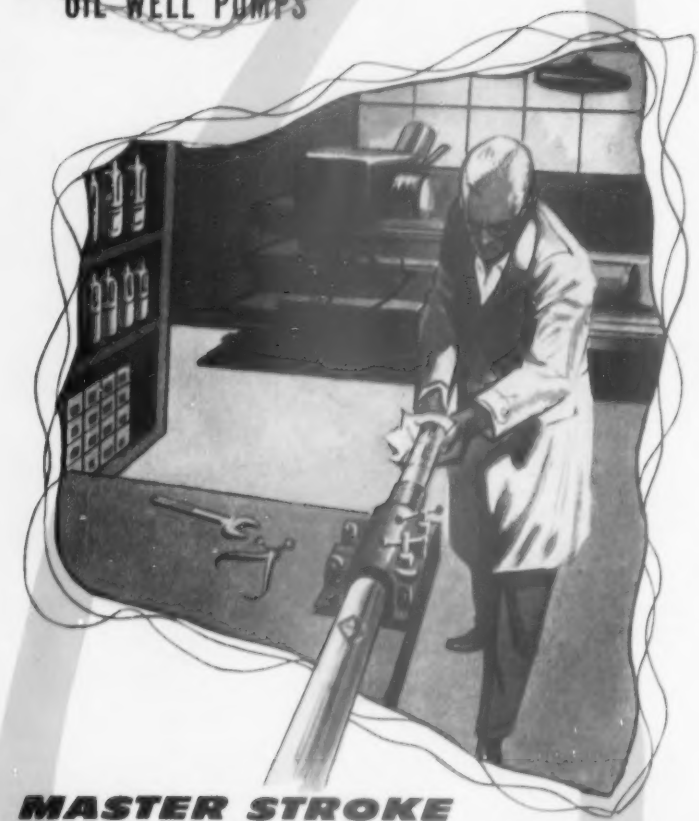

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OIL WELL PUMPS

discovery in Beauregard Parish 1 mile northwest of Fulton has been potentialed by Texas Gulf Producing Co.

The 1 W. J. Herpin, 19-6s-8w, flowed 45 bbl. of 56.7°-gravity distillate plus 136,610 cu. ft. of gas per day on 11/64-in. choke.

ROCKY MOUNTAIN

NEBRASKA

Red Willow Wildcat Reports Pennsylvanian Show

Rothmeier and Betts, Nebraska independents recovered 35 ft. of oil-cut mud on test of Lansing at 1 Harris, NW NW NW 23-2n-30w, Red Willow County. Test was at 3,697-3,738 ft. The well is a proposed test to granite. While recovery on drill-stem test did not indicate commercial possibilities, the operators will conduct further tests before reaching a decision on running of casing. A second well has already been staked at 1 Randel, SE SE NE 27-1n-29w. The county has had sporadic exploration during the past several years without major encouragement.

Kimball County Discovery

Sam Joseph, California independent reported recovery of oil at the rate of 25 bbl. per hour on swab test of 1 Houtby, SE SE SE 5-14n-54w, Kimball County. The operator is now installing pump. Tests were of the interval 6,002-10 ft. The well is about 5 miles north of production in Southwest Potter pool.

WYOMING

Small Weston County Discovery Completed

James P. Sloss and S. D. Johnson reported a gage of 32 bbl. of oil per day, flowing at 1 Cummings, NE SE SE 2-44n-65w, Weston County. The operators previously reported about 14 ft. of apparently productive sand in the wildcat which is about 1½ miles north of production in West Mush Creek.

Sweetwater County Wildcat Being Abandoned

General Petroleum Corp. is preparing to abandon 1 Buckhorn Unit, NW SW SE 28-25n-105w, Sweetwater County. The well is the first test of the unit, which is about 19 miles southeast of LaBarge field. Total depth is 8,205 ft.

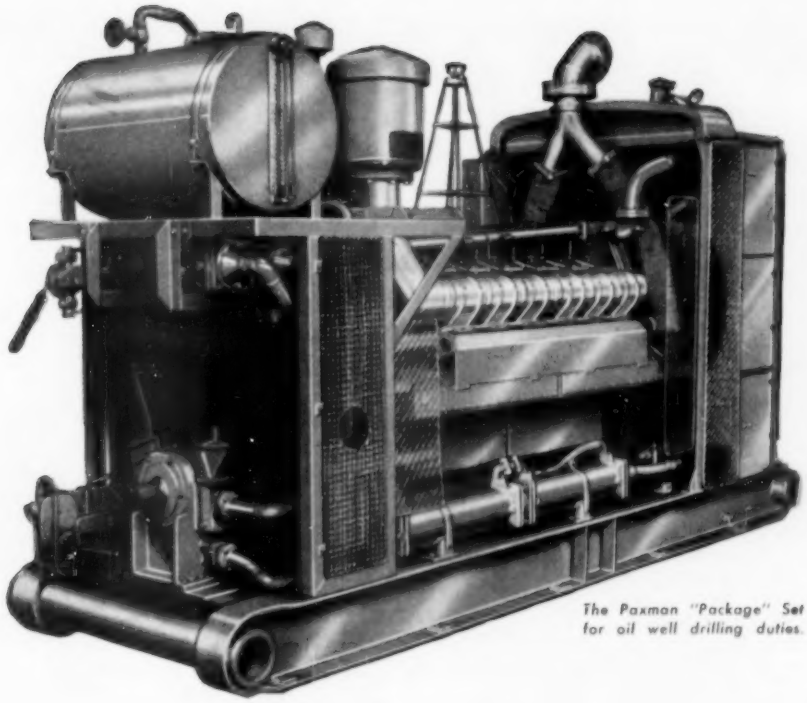
Washakie County Test Recovers Show

The California Co. recovered 90 ft. of mud-cut oil on test of Phosphoria at a wildcat about 5 miles southeast of production at Neiber Dome, Washakie County. The well is 8 Neiber Dome Unit, NW NW NE 30-45n-91w. Test was of the zone 10,277-10,306 ft. and recovery also included 90 ft. of oil-cut mud and 90 ft. of mud with a slight oil show.

MONTANA

West Poplar Test Staked

Carter Oil Co. and Phillips Petroleum Co. have made location for their fourth joint venture in the 24,000-acre West Poplar unit,



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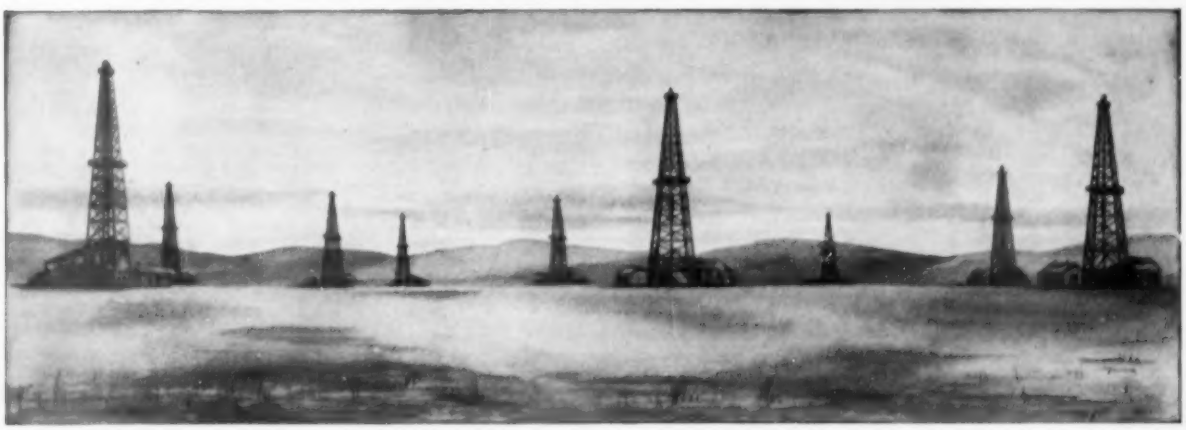


Roosevelt County. The well is 1 Tribal, C SW SW 5-29n-50e, in the northeastern part of the unit. Previous tests were failures, but did log some shows.

Fallon County Wildcat Recovers Additional Oil

Shell Oil Co. recovered 2,130 ft. of watery oil on test of Mission Canyon at 14-34 MDU Unit, C SW SW 34-5n-61e, Fallon County. Test was of the interval 6,857-6,905 ft. and included in addition to the oil, 100 ft. of oil water about 15 per cent oil, was recovered. A previous test 6,828-58 ft. recovered 1,720 ft. of oil and 460 ft. of oil-mud emulsion. The operator is drilling below 7,000 ft. and will test deeper horizons.

Glacier County Discovery Reported

Unofficial reports which have not been confirmed by the operator indicate a flow of 12 bbl. of oil per hour from Madison at Superior Oil Co.'s 1 Berkram, NW NE NW 35-37n-5w, Glacier County. The well is in the North Cut Bank area and is a mile south of the Darling pool. Recovery was credited to Madison with top of the formation at 2,732 ft.

LEGAL

Notice is hereby given that sealed bids for oil and gas leases on approximately 43,228.40 acres of Allotted and Tribal restricted Indian lands in Roosevelt and Daniels Counties on the Fort Peck Indian Reservation, State of Montana, will be opened at 2:00 P.M., Mountain Standard Time, August 25, 1954, at the Fort Peck Indian Agency, Poplar, Montana. Those individuals desiring specific information in connection with this sale may contact the Superintendent, Fort Peck Indian Agency, Montana, or telephone, Poplar, 2181.

Cabin Creek Failure Reported

Shell Oil Co. has abandoned 32-4 NP Unit, C SW NE 4-9n-58e, the southernmost well in the Cabin Creek unit, Fallon County. Total depth was 9,415 ft. The operator reported only slight shows of oil in Madison, Silurian and Ordovician, all of which are productive or apparently productive at other wells in the field. The well ran consideraby lower structurally than those previously drilled in the field.

COLORADO

Washington County Discovery Completed, Shut In

J. M. Thomson, Denver has completed 1 Heiserman, SE SE SW 25-3n-50w, Washington County, after recovery of gas at the rate of 2,500,000 cu. ft. per day. The well is shut in. Total depth is 4,070 ft. The well is about 25 miles east of previous Denver-Julesburg basin production.

NORTH DAKOTA

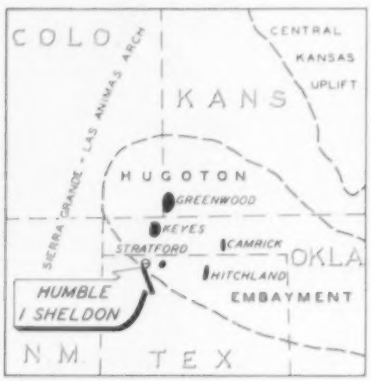
McKenzie County Wildcat Recovers Water On Test

The California Co. swabbed acid and water with no show of oil or gas following treatment of 1 Unit, NW NE 13-148n-98w, McKenzie County. The test is the first of the company's Rough Creek unit. Test was of perforations 9,785-9,820 ft. The operator is continuing to swab.

HUGOTON EMBAYMENT

Cisco Discovery Hinted In Dallam County Area

An indicated Cisco gas discovery is Humble Oil & Refining Co.'s 1 Sheldon, Section 16, Block 50, H&TC Survey, 3 miles southwest of Kerrick in the northwestern part of the Texas Panhandle (arrowed on map).



Four drill-stem tests were run in the Cisco, each recovering gas. Drilling is under way at 3,914 ft. The tests were taken at 3,578-3,608 and 3,606-28 ft. Final test was at 3,625-58 ft.

The indicated strike is located 7 miles west of new Stratford Cisco field in Sherman County, Texas, and 17 miles south of Cimarron County, Oklahoma's Keyes field.

Cherokee Discovery Assured Southeast of Kismet

A Cherokee discovery is assured at The Ohio Oil Co. 1 Bond, Meade County, Kansas wildcat, 9 miles southeast of Kismet, 2 miles south of East Kismet field, and 2 miles west of Novinger field.

The wildcat swabbed 56 bbl. of 38°-gravity oil in 10 hours from perforations at 5,619-31 ft. in the Cherokee.

NEW MEXICO

SOUTHEASTERN NEW MEXICO

Lea County Wildcat Flows Oil from Bone Springs

Shell Oil Co. 1 Harper, Lea County wildcat in 27-19s-35e, developed considerable free oil on a drill-stem test of the Bone Springs limestone, and unloaded clean oil for 20 minutes after operators had pulled 21 stands of pipe.

The test was run from 8,238-70 ft. Gas surfaced in 5 minutes with volume unestimated. Total recovery on the test was estimated at 5,850 ft. Operators continued drilling on a 13,000-ft. contract.

Geologic position of the Bone Springs in a generalized stratigraphic column of the Permian basin in West Texas covers the entire group from the San Andres to the top of the Wolfcamp, and is middle-Permian in age.

A second drill-stem test to unload was run from 8,440-8,563 ft., but was not identified as to section. On this test, open 2 hours, gas surfaced in 12 minutes and oil unloaded after 26 stands of pipe had been pulled.

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SHREVEPORT, LOUISIANA
D. K. "Dewey" Davis, Drilling Superintendent

Continental Oil Co. 1-35 Fisher, wildcat 2 miles northeast of Hare pool, recovered 1,700 ft. of oil and gas-cut mud, plus 90 ft. of free oil on a drill-stem test in the Abo from 7,140-7,390 ft. A later test of the lower Abo from 7,390-7,490 ft. recovered 270 ft. of mud with no shows.

In the Delaware basin, Continental 1-A Bell Lake Unit, twin well to the first test which had to be abandoned, was drilling below 9,030 ft. at last report. The firm's 2 Bell Lake Unit, 1 mile north of the first well, was drilling below 11,952 ft. in lime and shale. This well recovered 300 ft. of gas-cut mud on a test in the Bone Springs at 8,680-8,793 ft.

Eddy County . . . Stanolind Oil & Gas Co. 1-A State, wildcat in 3-19s-28e, flowed oil and water-cut mud to pits for 25 minutes, then was turned into tanks when the flow died. Recovery from the pipe was 4 bbl. of oil and 65 bbl. of salt water. Drilling continued on a 11,000-ft. contract.

CANADA

Three Discoveries Recorded In Two Western Provinces

Western Canada's exploration operations during the past week resulted in three wildcat discoveries, including two oil strikes and one natural gas find. Oe of the oil discoveries is in Manitoba, while the other oil strike and the natural gas discovery are in Alberta.

This week's Alberta oil find was chalked up in the famed Leduc-Woodbend area, where initial oil production was obtained about 7½ years ago, and where exploration and development operations are continuing to yield oil productive wells.

The new strike was made in the Woodbend sector of this prolific oil district, about 10 miles southwest of Edmonton. The oil, a light-gravity product, came during a drill-stem test in an unidentified formation, in what appears to be a dolomitic section below the D3 Devonian reef. Owner of the well is Imperial Oil, Ltd., the company that drilled the 1 Leduc discovery well in February of 1947.

The well is Imperial 121 Woodbend, LSD 6, 11-51-26w4. It lies about 1 mile east of Devonian D2 and D3 producing oil wells, 1½ miles west of Lower Cretaceous formation oil production and about that some distance north of D2 and D3 producers.

During a 1½-hour drill-stem test in the unnamed oil production formation, from 5,695 to 5,704 ft., natural gas flowed at rate of 360,000 cu. ft. daily, and when drill pipe was pulled it was found to contain 4,800 ft. of oil, 90 ft. of mud and 450 ft. of salt water.

After taking the hole down to 6,280 ft., crew set string of production casing. Evaluation tests will likely be commenced next week, in an effort to determine whether the well can be produced on a commercial basis.

Sturgeon Lake . . . Amerada Petroleum Corp., a large American oil firm, this week discovered natural gas in the southwest sector of Sturgeon Lake, in northwest Alberta. Sturgeon Lake, about 175 miles northwest of Edmonton, recorded its first oil production at an Amerada wildcat about 2 years ago. To date, 13 wells have been assured of D3 Devonian oil production in that region. The new gas discovery, located 6½ miles southwest of oil production in the Little Smoky sector of the field, was made in the Bluesky formation.

The exploratory driller is Amerada AG

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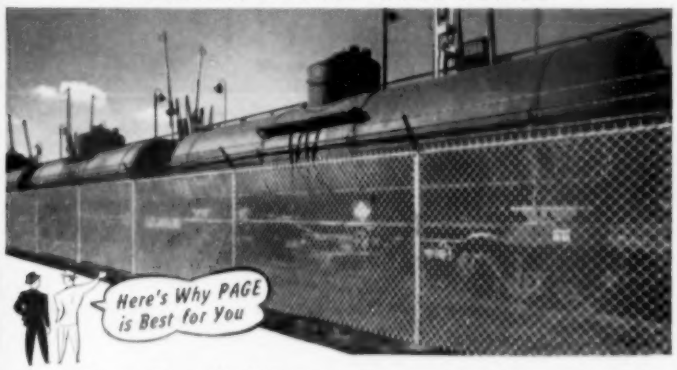

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You may also obtain a copy of a very interesting report made recently on tidelands possibilities by Ira U. Cobleigh, economist on the staff of the Commercial and Financial Journal. "Oil and water can mix if the technique is right," Mr. Cobleigh says.

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11-15 Crown, LSD 11, 15-67-23w5. An 87-minute drill-stem test from 5,565-90 ft., through ½-in. choke, flowed gas in 5 minutes, at maximum rate of 3,200,000 cu. ft. daily. Pipe recovery was 708 ft. of salt water. The well is scheduled to be taken down in search of D3 Devonian reef, in hopes of encountering oil production.

Also this week at Sturgeon Lake, Hudson's Bay Oil & Gas Co., Ltd., announced that the Hudson's Bay-Union 15-31 Liberal D3 Devonian oil extension success has rated an estimated initial potential of 4,476 bbl. of oil daily. This potential is based on a 2-hour test that flowed 373 bbl. of oil, after perforating 60 ft. of the pay column and acidizing that zone. D3 reef was entered at 8,276 ft., or 6,154 ft. subsea, and about 214 ft. of oil zone was encountered prior to entering formation water.

This well, located on LSD 15, 31-68-21w5, is 3¼ miles southeast of previously drilled oil wells. It was drilled by Hudson's Bay and Union Oil Co. of California, on a 100,000-acre crown reservation farmout from the Liberal-Mic Mac group.

A second well on that farmout has been abandoned, and a third site has been staked and will be drilled as soon as road conditions improve in the district.

Manitoba . . . The new Manitoba oil discovery this week came in the southwest corner of that province, that portion of Manitoba that has yielded all the province's commercial oil wells to date. The new strike, on the northeast edge of the huge Williston basin, is owned by a Regina independent, Sooner Petroleums, Ltd.

Sooner's 8-15 Hayhurst discovery, LSD 8, 15-9-28w1, in the Cromer area, is 3¼ miles southeast of Daly field oil production. Like the Daly oil wells, the Sooner venture found its oil in the Mississippian, but at this stage it is too early to determine whether it will tie into that field as an extension, so must be classed as a new discovery. There are, however, no abandoned wells drilled between it and the main field. It is 15 miles southwest of Virden town, and 55 miles west-southwest of Brandon.

A 2-hour drill-stem test in the Mississippian, from 2,535-60 ft., flowed mud in 35 minutes and oil in 45 minutes. Estimated flow rate was 5 bbl. hourly. String of casing will likely be run for production tests.

EASTERN CANADA

Gaspe . . . In the Gaspe Peninsula, Quebec Province, 2 Bald Mountain, on the Bald Mountain anticline has resumed drilling from 6,170 ft., after the winter shut down. Participating companies are Bald Mountain Oil Co., incorporating the Paul Payette 50 per cent interest, with 40 per cent held by Gaspe Oil Ventures and 10 per cent by Quebec Oil Development, Ltd. Their holdings, totaling 54,000 acres, blanket the structure.

Evidence of oil-saturated reefs in the general area has been known for some time, and exploration by a geological party from the Quebec Mines Department in 1953 strongly indicated true reefs in limestones of Middle Silurian age in this region. A reef, composed mainly of algae and 400 to 500 ft. thick was found, forming a pronounced topographic feature in the Madeleine River area, a few miles northwest.

Recently, a well a few miles southwest, drilled by outside interests, penetrated these reefs around 8,200 ft. with pronounced evidence of oil and gas, which is being tested. Correlation of cuttings and logs of the two wells with the Madeleine River geology indicates 2 Bald Mountain should get the oil-bearing reefs at about 6,570 ft.

Ontario . . . Union Gas Co., drilling on the Mrs. Sanford Logan farm, Lot 1, Concession 5 Enniskillen Township in Lambton County has encountered gas, apparently in commercial quantities. At about 2,000 ft. Location is 2 miles east of Brigden, and Kiser Drilling of Chatham has the contract. Several dry holes have been drilled in the general area in the past few years.

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MISSISSIPPI

Smith County Gets Its First Oil Producer

Union Producing Co. has completed Smith County's first oil producer at A-2 Riffin unit, 29-10n-13w, on the west flank of Eutaw production and 1½ miles west of Soso field deep Rodessa production.

The strike produced from perforations at 11,987-12,006 ft. in the Bailey sand (Rodessa). The well flowed at the rate of 216 bbl. of 42.3°-gravity oil per day through ⅛-in. choke. Twenty zones in the well showed for oil or gas during the drilling of the well.

Second Offset Staked At Bolton Field Discovery

The second offset to Hinds County's recent major oil discovery at Larco Drilling Co. 1 McAlpin, which opened Bolton field, has been staked.

Magnolia Petroleum Co. is preparing location for a north offset to the Bolton discovery at 1 Cockrum, SE NE 19-6n-2w. The wildcat is projected to 11,000 ft. and it is

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believed that the test will take in part of the Rodessa formation.

A south offset to the Bolton discovery is already under way, drilling below 6,240 ft. at Sun Oil Co. 1 Lancaster-McAlpin Unit, SE SE 19.

Larco's 1 McAlpin was recently completed in NE SE 19-6n-2w, as one of the best discoveries in Mississippi to date. It flowed at the rate of 288 bbl. of oil per day from Paluxy perforations at 9,920-40 ft. on ⅛-in. choke.

Baker Sand Oil Pool Opened in Franklin

Franklin County has a new Wilcox oil discovery at John S. Callon 1 Mary S. Thompson, 42-5n-1e.

The discovery well flowed at the rate of 106 bbl. of oil per day through 10/64-in. choke from the Baker sand at 6,391-94 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

District 1

Blanco County: J. M. Tuggle 1 Flannery, Henry Manton 17. Dry. TD 1,400 ft.

Frio County: C. G. Dunwoody, Jr. 1 Oppenheimer & Lang, Wm. Wilson 12, A-665. Dry. TD 4,610 ft.

Gonzales County: Continental 1 O. W. Cardwell et ux, Bird Lockhard A-37. Dry. TD 6,041 ft.

Producers Corp. of Nevada et al 1 Wright, Samuel McCoy A-304. Dry. TD 2,507 ft.

Turner & Hughes 1 Terrell, J. G. King. Dry. TD 2,485 ft.

Medina County: Stanross Production Co. 1 Mrs. Kattie Hartman et al, John F. Tonney Sur. 108. Temp. abd. TD 977 ft.

Stuart, Burkhart & Duncan 1 Swenson, M. Denson Sur. 449. Dry. TD 1,673 ft.

Wilson County: W. O. Fortenberry 1 Beasley, A. Highsmith Sur. A-153. Dry. TD 1,672 ft.

2 Beasley, A. Highsmith Sur. A-153. Dry. TD 1,801 ft.

Texas Southern Oil & Gas Co. 1 Rice, C. Zepeda Sur. A-362. Dry. TD 2,878 ft.

District 4

Aransas County: Arnold O. Morgan 1 D. W. Grant and Clyde Jennings, Chas. Zenn. Dry. TD 9,540 ft.

Brooks County: Forest Oil Corp. 1 Gardner, E. C. Wright A-702. Dry. TD 7,504 ft.

Duval County: Goldston Oil Corp. C-2 Ed Canales, CEPI&M 571, A-200. Dry. TD 4,103 ft.

Hidalgo County: Heep Oil Corp. and Herman F. Heep 1 Caples, Llano Grande Grant. Dry. TD 8,006 ft.

Jim Wells County: Chas. A. Daubert and E. H. Dolch 1 Chas. Muil, J. Poitevent 201, A-370. IP Shut-in gas well, perfs. 4,594-99 ft. Top pay 4,594 ft. TD 5,724 ft.

Kirkwood & Morgan 1 Pfeiffer, Los Presenos A-281. Dry. TD 5,712 ft.

Smith, Delange & Progress Petroleum Co. 1 W. H. Evetts et al, Magnolia Fig and Orange Colony Subd., IPF 82 BOPD, ⅜-in., top pay 4,270 ft., perfs. 4,272-82 ft. TD 6,000 ft. 21.6°, GOR 265:1. (New pay at North Magnolia City).

Kenedy County: Continental Oil Co. 1 State of Texas 393, Laguna Madre. IP 20,000 M.c.f. of gas per day, open flow, Frio top pay 9,400 ft., perfs. 9,404-34 ft. TD 13,000 ft. (Gas well).

La Gloria Corp. Kenedy Ranch, Rincon del Penascal Grant. Dry. TD 8,505 ft.

TEXAS GULF COAST

District 2

Calhoun County: Arnold O. Morgan 1 American National Insurance Co., Santiago Gonzales A-19. Dry. TD 6,155 ft.

Jackson County: Continental Oil Co. 1 Kuppinger Unit, F. Stack Sur., A-74. Dry. TD 11,031 ft.

Magnolia Petroleum Co. 1 Holzeheuser, John Alley, S-3. Dry. TD 4,712 ft.

Karnes County: Morris Cannan and Robert D. Mebane 1 Campbell, Henry B. Ward, A-916. Dry. TD 6,650 ft.

John J. Coyle 1 Coldeway, Carlos Martinez A-6. Dry. TD 8,730 ft.

Live Oak County: Edwin Singer Trustee 1 Jones, AB&M Sur. A-62. Dry. TD 4,500 ft.

Texita Oil Co. and W. M. Averill, Jr. 1 Slick, Victoria Chapa A-739. Dry. TD 2,844 ft.

Victoria County: David Hannah, Jr. 1 Angerstein, Manuel Zepeda A-128. Dry. TD 4,412 ft.

District 3

Brazoria County: P. R. Rutherford 1 Munson, S. Carter A-53 and A. Mitchell A-97. Dry. TD 11,432 ft.

Hardin County: American Republics Corp. 3 Hampton, A. Hampton Lge. IP 10,500 M.c.f. of gas per day, Yegua 7,638-42 ft., GOR 22,013:1, 64.6°. TD 8,170 ft. (New pay at Hampton.)

Waller County: R. N. Ranger 1 Wilpitz, H&TC 50. Dry. TD 8,005 ft.

Tyler County: Humble Oil & Refining Co. H-1 East Texas Oil Co. Fee, G. W. Roper, A-756. IPF 38 BOPD, 9/64-in., GOR 1349:1, 37.5°, 8,746-74 ft. TD 10,500 ft. (New pay at Pavey.)

EAST TEXAS

Cherokee County: Eugene Talbert and P. G. Lake, Inc. 1 Nyman, John Moffatt Sur., A-610, 1½ mi. NE Mt. Selman. IP 9,000 M.f.g., plus 8 bbl. 67° distillate per 1,000 M.f.g., open flow, sub-Clarkesville perforations 4,572-74 ft. SIP 1,715 psi. TD 4,900 ft.

Freestone County: William Dark 1 Calame, R. B. Longbotham Sur. Dry. TD 1,313 ft.

Harrison County: Ark-La Gas Co. 2 Anita Bookout, Patrick Daugherty Sur., A-5, 3 mi. SE Scottsville. IP 6,000 M.f.g., open flow, lower Pettit 6,184-89 ft. Flowing tubing pressure 975 psi. TD 6,577 ft.

Gilster & Kemp 1 Harris, GH&H Sur. 1, A-292, 3½ mi. E South Hallsville field. IP 260,000 cu. ft. gas, plus 60 bbl. 64° distillate per 1,000 M.f.g., RP 2,715 psi., Pettit perforations 6,511-20 ft. TD 6,593 ft.

Hunt Oil Co. 1 Brooks, Joseph Fields Sur., 3 mi. S Marshall. IP 400,000 cu. ft. gas, lower Pettit 6,504-16 ft. TD 6,795 ft.

Henderson County: E. B. Larue 1 Farmer, Phillip Jackson Sur., A-392. Dry. TD 4,756 ft.

LEGAL

SEALED BIDS for Oil and Gas leases on the Crow Indian Reservation, Montana, will be received in the Office of the Superintendent, Crow Agency, Montana, until 2:00 o'Clock P.M. (M.S.T.), Wednesday, September 8th, 1954, at which time they will be opened and publicly read. Sixty-two (62) Units involving 16,383.40 acres of individually owned trust lands, a portion of which mineral rights are reserved for the benefit of the Crow Tribe by Act of Congress, will be offered. For further detailed information and a list of lands advertised, call or write: L. C. Lippert, Supt., Crow Indian Agency, Crow Agency, Montana.

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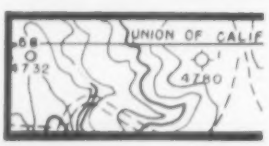

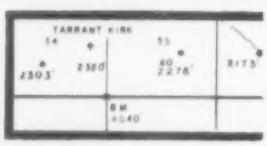

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WESTERN OFFICE: (Denver) Lakewood, Colo., 995 Flower St., Phone Bel. 3-2090

Hopkins County: F. R. Jackson 1 Spencer, G. Linceum Sur., A-561, 9 mi. NE Sulphur Springs. IPP 124.4 BOPD, 53°, GOR 200 cu. ft., no water, Paluxy perforations 4,741-44 ft. TD 4,855 ft.

Navarro County: Earl Harter 1 Berg, Pedro Quero Sur., A-669. Dry. TD 3,486 ft.

F. R. Jackson 1 Corsicana State Orphans Home, J. W. Williams Sur., A-850. Dry. TD 2,205 ft.

M & M Production Co. 1 Brown, Thomas Ross Sur., A-672. Dry. TD 675 ft.

Shelby County: H. J. Chavanne 1 Adams, Benjamin White Sur., A-762. Dry. TD 7,330 ft.

Wood County: Ace Oil Co. 1 Logan, Elijah Allen Sur., A-8. Dry. TD 5,100 ft.

TEXAS PANHANDLE

Hansford County: Fulton 1 Alexander, 45-6-H&TC. Dry. TD 7,500 ft.

Hutchinson County: Phillips Petroleum Co. 8 Price-strat, 2-222-I&GN. Dry. TD 1,200 ft.

Phillips 9 Price-strat, 2-224-I&GN. Dry. TD 1,600 ft.

Phillips 10 Price-strat, 2-193-I&GN. Dry. TD 1,250 ft.

Wheeler County: Sinclair Oil & Gas Co. 2 Mills, A-7-4-H&GN. Dry. TD 10,641 ft.

WEST CENTRAL TEXAS

Brown County: K. S. Richards 1-A Wilson, Sec. 69, BBB&C Sur. IP 2,000 M.f.g., pay 928 ft., TP 430 psi. TD 1,163 ft.

Callahan County: R. J. Windrow 1 Mason, 3-1-SPRR. Dry. TD 2,110 ft.

Woodson Producing Co. 2 Cutbirth, Bartola Garcia Sur. Dry. TD 832 ft.

Coleman County: Bridwell Oil Co. 1-A Walker, J. T. Dillion Sur. 756. Dry. TD 2,235 ft.

B. F. Weekly 1 Dyer, Elias Eubanks Sur. 270. Dry. TD 2,411 ft.

Woodson Producing Co. and Callihan Rotary Co. 1 Hudson, D. F. Roddan Sur. 36. Dry. TD 3,586 ft.

Haskell County: O. E. Hall 1 Bettis, 180-45-H&TC. Dry. TD 5,120 ft.

Jones County: L. A. Hedrick 1 Smith, 16-4-H&TC. Dry. TD 2,624 ft.

Oscar Irvin 1 Pittard, Sec. 27, OAL Sur. Dry. TD 3,070 ft.

J. S. Swearingen 1 Lee, 76-1-BBB&C. Dry. TD 3,300 ft.

U. S. Epperson Underwriting Co. 2 Deavers, 33-18-T&P. Dry. TD 5,075 ft.

J. W. Geihle 1 White, 13-1-T&NO, 1½ mi. NW Anson. IPP 101.8 BOPD, 40°, ¼-in., TP 300 psi., GOR 1,842 cu. ft., pay 3,060 ft. TD 3,175 ft.

Woodson Producing Co. 1 Hay, S. M. Hale Sur. 251. Dry. TD 2,490 ft.

Shackelford County: S. C. Herring Drilling Co. 1 Elliott, Sec. 39, BAL Sur. Dry. TD 4,375 ft.

Taylor County: Hack Drilling Co. 1 Ford, J. C. Eccles Sur. 472. Dry. TD 4,430 ft.

Caroline Hunt Sands 1 Bigham, 130-64-H&TC. Dry. TD 5,762 ft.

Kewanee Oil Co. 1 Cox, 297-64-H&TC. Dry. TD 5,792 ft. Elev. 2,336 ft., Ellenburger 5,675 ft.

Throckmorton County: Pure Oil Co. 1-A Travis CSL, Subd. 49, Travis CSL Sur. Dry. TD 4,780 ft.

NORTH TEXAS

Archer County: E. B. Clark Drilling Co. 1 Hilbers, 39-3-Clark & Plumb Subd. Dry. TD 3,852 ft.

Consolidated Oil Co. 2-H Prideaux, H. Pearce Sur., A-340. Dry. TD 3,950 ft.

Grace & Ford Drilling Co. 1 Abercrombie, Blk. 51, Harris Subd. Dry. TD 1,555 ft.

Gray Oil Co. 1 Gray Oil Co., H. H. Kirk Sur., A-248. IPP 11.55 BOPD, 39°, Cisco 1,389-1,400 ft. TD 1,430 ft.

J. W. Harvey 3 Cowan & McKinney, R. Hackett Sur., A-173. Dry. TD 1,265 ft.

Morgan Bros. 1 Petrex, 3-114-ATNCL Sur. Dry. TD 1,454 ft.

P-M Drilling Co. and Buzz Morgan 1 Petrex, Blk. 64, ATNCL Subd. Dry. TD 4,510 ft.

Baylor County: Childress Drilling Co. 1 Williams, 46-A1651-H&TC. Dry. TD 1,656 ft.

J. J. Lynn 1-K Cowan, Sec. 2, T&NO Sur. Dry. TD 4,707 ft.

Clay County: Perry Browning 1 Russell, Blk. 15, Grayson CSL. Dry. TD 5,020 ft.

L. T. Burns 1 Hurdleston, Blk. 96, Belcher Subd., Yearley Sur. IPP 84 BOPD, 42°, GOR 270 cu. ft., Strawn 4,541 ft. TD 4,551 ft.

J. W. Hastings et al 1 Oliver-Clerihew, TE&L Sur. 2628. Dry. TD 3,492 ft.

Star Oil Co. 1 W. T. McNeill heirs, T&NO Sur. 1, A-671. IPP 17 BOPD, 41°, Caddo pay 4,969-77 ft. TD 6,336 ft.

Cooke County: Kay Kimbell 1 Paul Hite, A. D. Kendall Sur., A-555. Dry. TD 4,390 ft.

Kimbell 1 Stone estate, SPRR Sur., A-970. Dry. TD 3,000 ft.

T & T Oil & Gas Co. 1 Fischer, Blk. 18, John Barnett Sur. Dry. TD 1,710 ft.

Jack County: F. Kirk Johnson 1 Bailey, A. M. Bailey Sur., A-1579. IP 3,200 M.f.g., Marble Falls 4,382-94 ft. TD 4,469 ft.

W. A. Lofton & Burt Oil Co. 1 Graham, TE&L Sur. 3346, A-835. Dry. TD 3,280 ft.

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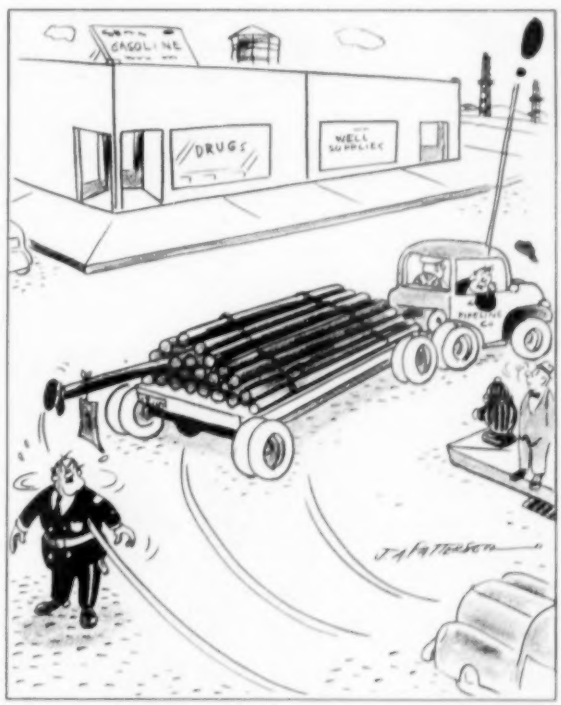

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Russell Maguire 1 Lowe, BBB&C Sur. Dry. TD 3,922 ft.

C. J. Wrightsman 1 Whitaker, SPRR Sur. 3, A-566. Dry. TD 5,482 ft.

Montague County: Lloyd H. Smith, Inc. 1 Hawkins, H&TC Sur. 17, A-362. Dry. TD 5,875 ft.

Wichita County: Consolidated Oil Co. 3 Cruse, Blk. 9, Cherokee CSL. Dry. TD 2,304 ft.

G. T. West Trustee 1 Fritz, Blk. 9, Denton CSL, A-58. IPP 132 BOPD, ¾-in., TP 180 psi., GOR 400 cu. ft., 40°, Strawn 3,820-44 ft. TD 4,362 ft.

Young County: Midwest Oil Corp. 1 Wright, SPRR Sur. 1, A-267. Dry. TD 4,586 ft.

John T. Wilson 1 Allar Co., TE&L Sur., 12 mi. W Graham. Dry. TD 4,264 ft.

WEST TEXAS

Bailey County: Great Western Drilling Co. 1 Lucus, 24-108-Fisher CSL. Dry. TD 5,016 ft. Elev. 3,810 ft. estimated, San Andres 3,808 ft., Glorietta 4,635 ft.

Borden County: Pan American Production Co. 1-B Good, 2-33-T3N-T&P. Dry. TD 8,605 ft. Elev. 2,670 ft., reef 8,583 ft.

Cochran County: W. S. Boyle 1 Hall, 17-U-PSL. Dry. TD 436 ft.

Crockett County: Howsley & Jacobs 1 Shannon, 7-BB-EL&RR. Dry. TD 2,560 ft.

Humble Oil & Refining Co. 1-AB State, 12-51-University Lands. IP 114 BOPD, 14/64-in., TP 250 psi., GOR 589 cu. ft., 44°, perforated 9,246-96 ft. TD 9,549 ft.

Northern Natural Gas Production Co. 1 Archie Bean, 12-UV-GC&SF. Dry. TD 8,437 ft.

Pure Oil Co. 35 Vaughn, 82-OP-GC&SF, 10 mi. NW Ozona, discovery of Vaughn-Ellenburger field. IP 480 BOPD, ¾-in., TP 100 psi., GOR 527 cu. ft., 42°, Ellenburger 7,582 ft., perforated 7,706-92 ft. TD 7,850 ft.

Hockley County: Ashland Oil & Refining Co. 1 Harris, 12-73-Haskell CSL. Dry. TD 4,902 ft.

Great Western Drilling Co. 1 Thomas Davis, 1-17-Wichita CSL. Dry. TD 10,127 ft. Elev. 3,464 ft., Canyon 9,748 ft., lower Canyon 10,060 ft.

Sunray Oil Corp. 1 Hale, 5-707-State Capitol Sur. Dry. TD 6,975 ft.

Howard County: Lone Star Producing Co. 4 Walters, 34-34-T1N-T&P. IPP 30.3 BOPD, 28°, pay 3,161 ft. TD 3,170 ft.

Williamson & Harrell 1 Morgan, 40-32-T1S-T&P. Dry. TD 3,353 ft.

Lubbock County: Western Drilling Co. 1 Taylor, 12-E2-B&B. Dry. TD 5,520 ft.

Motley County: General Crude Oil Co. 5-1 Swanson "A", 5-MC-Matador Land & Cattle Co. Sur. Dry. TD 5,154 ft. Elev. 2,071 ft, pre-Cabrian 5,098 ft.

Pecos County: Blackwood & Nichols 1 Slaughter, 29-129-T&STL Sur. Dry. TD 13,822 ft.

Trebol Oil Co. 1 Lilley, 16-9-H&GN. Dry. TD 2,661 ft.

Reagan County: Plymouth Oil Co. 1-A University, 8-49-University Lands. Dry. TD 2,549 ft.

Reeves County: Chas F. Garlitz, Renaud & Tunstill 1 Pace, 37-1-H&GN. Dry. TD 3,923 ft. Elev. 2,709 ft., Delaware sand 3,912 ft.

Trico Exploration Co. 1 Grown, 22-56-T2-T&P. Dry. TD 3,546 ft. Elev. 2,807 ft., Delaware sand 3,232 ft.

Sterling County: R. D. Gillham 1-31 Clark, 31-11-SPRR. Dry. TD 1,483 ft.

Panuco Oil Leases, Inc. 1 Chappell, 69-18-SPRR. Dry. TD 7,784 ft. Elev. 2,147 ft., Strawn 7,230 ft., Ellenburger 7,715 ft.

Sutton County: Ray Morris 1 Thompson, 32-A-HE&WT. IP 24,500 M.f.g., open 2-in., pay 5,218-60 ft. TD 5,383 ft. (?)

C. L. Norsworthy, Jr. 2 Meckel, 93-A-HE&WT. IP 300 M.f.g., pay 5,462-5,618 ft. TD 5,830 ft.

Upton County: Edwin L. Cox 1 Gentry, Sec. 96, Blk. Y. Dry. TD 5,598 ft. IP 76.9 BOPD, pay 5,182-5,280 ft. TD 11,860 ft., PB 5,541 ft.

WEST TEXAS BORDER COUNTIES

Coke County: Group Oil Co. et al 1 Foster, 229-2-H&TC. Dry. TD 6,931 ft.

Fisher County: Pan American Producing Co. 1 Oates, William Lytle Sur. 227. Dry. TD 6,003 ft.

Nolan County: T. C. Huddle and Imperial Production Corp. 1 Boyd, 85-21-T&P. Dry. TD 6,708 ft.

Runnels County: Gulf Oil Corp. 1 Barron, L. Forsythe Sur. 450, A-176. Dry. TD 5,401 ft.

Sid Katz and Wayne Petroleum Co. 1 Eubanks, 58-63-HT&B. Dry. TD 4,802 ft.

Union Sulphur & Oil Corp. 1-A Bright, CCSD&RGNG Sur. 35. Dry. TD 4,140 ft.

Womer & Tilton Oil Co. 1 Henderson, Sec. 56, A. G. Willis Sur. Dry. TD 4,847 ft.

Stonewall County: Cities Service Oil Co. 2 Flat Top, Sec. 124, BBB&C Sur. Dry. TD 3,304 ft.

Hack Drilling Co. and Wayne Petroleum Corp. 1 Nanny, Sterling McGraw Sur. 59. Dry. TD 5,908 ft.

Nueces County: Gulf Oil Corp. 1 State Lease 33100 (St. Tr. 48), Corpus Christi Bay. Dry. TD 6,617 ft.

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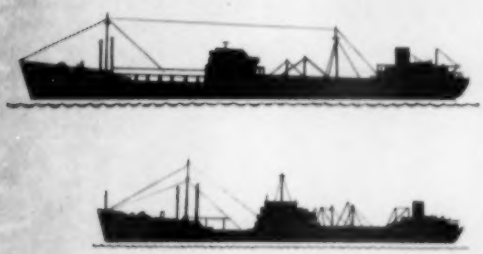

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BEAM — FEET	68	85	?
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HAVANA · SAN JUAN · CARACAS · BOGOTA · LIMA · GUAYAQUIL

San Patricio County: Haroldson L. Hunt, Jr. Trust estate and Kirkwood & Co. 1 Mayo, Coleman-Fulton Pasture Lands. IP 20,500 M.c.f. of gas per day, open flow, dry gas, Mayo perfs. 2,632-38 ft. TD 9,441 ft. (Discovery of Mayo field).

Renwar Oil Co. 1 Kate Peeks, M. Wright A-148. Dry. TD 9,025 ft.

Starr County: Appell Oil & Gas Co. B-1 Margo, Porcion 70 IP Sut-in gas well, top pay 2,184 ft., perfs. 2,184-95 ft. TD 2,812 ft.

Webb County: O. W. Killam 1 Billings, CCSD&RGNG 10, Blk. 1. Dry. TD 3,040 ft.

Killam & Hurd 2 Bruni estate, Jose V. Borrego. IPF 9,200 M.c.f. of gas per day, perfs. 5,125-28 ft., 58.8°, top upper Wilcox pay 5,125 ft., GOR 126,600:1. TD 5,353 ft. (Gas-condensate discovery of Reiser field).

SOUTHEAST NEW MEXICO

Chaves County: Lion Oil Co. 1 Haire, 12-6s-30e. Dry. TD 9,077 ft. Elev. 4,367 ft. Mississippian 8,300 ft., Devonian 8,748 ft., granite wash 9,035 ft.

NORTHWEST NEW MEXICO

San Juan County: Benson & Montin 1 Texas-Navajo, SE NW NE 5-25n-8w. IP 1,980 M.c.f. of gas per day, Pictured Cliffs discovery. TD 2,091 ft.

I Wilson, SE NW NW 32-26n-8w. IP 2,030 M.c.f. of gas per day, Pictured Cliffs discovery. TD 2,158 ft.

ILLINOIS

Clinton County: C. E. Brehm 1 Quick, SE SW NE 25-3n-2w. Dry. TD 1,554 ft.

Madison County: Joe Kesl, Jr. 1 Johanntose-teel, SW NE NW 34-6n-5w. Dry. TD 838 ft.

Monroe County: Jesse Ashby 1 Krehar, NE NE SW 2-3s-8w. Dry. TD 1,470 ft.

Richland County: Alva C. Davis 1 Gerhart, SW SE NE 6-2n-9e. Dry. TD 3,101 ft.

Shelby County: Welker Oil Co. 1 Stewardson, SE SE NW 16-11n-4e. Dry. TD 601 ft.

Wabash County: Juan Petroleum Co. 1 Kreeg, SE SE SE 29-1s-12w. Dry. TD 2,450 ft.

INDIANA

Dubois County: E. W. Pielemeister 1 Sendbuck, SW NW NE 5-1s-4w. Dry. TD 572 ft.

Jackson County: Ray Archibald 1 Garrett-Goodnight, NE SW NW 1-5n-3e. Dry. TD 760 ft.

Knox County: Harry Mark 1 Rout, (no spot) Don. 101-3n-9w. Dry. TD 1,503 ft.

Perry County: T. M. Egan 2 American Cannel Coal Co., SW SE SE 4-7s-3w. Dry. TD 800 ft.

Vandenburgh County: G. C. Schoonmaker 1 Rexing, SW NE NW 29-5s-11w. Dry. TD 1,370 ft.

KENTUCKY

Daviess County: Basin Drilling Co. 1 Miles, NW NE NE 20-O-28. Dry. TD 2,018 ft.

Henderson County: Eakles & Holder 1 Flack, NW SE SW 18-Q-20. Dry. TD 2,766 ft.

Hoffman & Turner 1 Waller, SW NE NE 2-P-26. Dry. TD 1,332 ft.

G. A. Hoffman 1 Busby, NE SE NE 3-N-24. Dry. TD 2,181 ft.

Eakles & Holder 1 Carey, NW NE SW 5-O-23. IPP 31 BOPD, Cypress 2,242-49 ft. TD 2,245 ft. Extenson to Corydon field.

WEST VIRGINIA

Randolph County, Roaring Creek district: Seneca Gas & Oil Co. 1 Thomas J. Cain, elevation 2,449 ft., 47,000 cu. ft., of gas after sandfrac, Fifth sand 2,233-2,253 ft. TD 3,165 ft.

SOUTH LOUISIANA

Acadia Parish: Sunray Oil Corp. 1 Robichaux, 15-11c-1e. Dry. TD 10,605 ft.

Allen Parish: Bel Oil Corp. 1-A J. A. Bel et al, 23-6s-4w. Dry. TD 8,430 ft.

Calcasieu Parish: W. T. Burton 1 Lutcher-Moore Lumber Co., 23-11s-12w. Dry. TD 9,050 ft.

Iberia Parish: The Texas Co. 1 Duhe "A", 50-12s-7e. Dry. TD 12,315 ft. Iberia deep test.

Lafourche Parish: Herman Brown, Seaboard Oil Co. and The California Co. 1 Bowie Lumber Co., 5-14s-18e. Dry. TD 12,294 ft.

Humble Oil & Refining Co. 2-M LL&E Co., 46-19s-22e. Dry. TD 11,642 ft.

Texas Crude Oil Co. 1 Unit, 5-18s-21e. IPF 9 BCPD, 2,106 M.c.f. of gas per day, top pay 10,292 ft., 10/64-in., GOR 234,000:1, 53°, perfs. 10,292-296 ft. TD 11,282 ft. (Gas well).

Plaquemines Parish: Continental Oil Co. 7 St. Lse 978-Blk. 53. IPF 259 BOPD, 11/64-in., perfs. 7,196-7,216 ft., GOR 795:1, 26.9°. TD 8,502 ft. (New oil pay at South Pass Block 24).

NORTH LOUISIANA

Bossier Parish: Pan American Producing Co. 1 Rushing-Vance Unit, 32-20n-13w. IPF 18 BCPD, 765 M.c.f. of gas per day, ¼-in., Roseberry 9,253-64 and 9,268-72 ft., 47.7°, GCR 42,500:1. TD 9,335 ft. (New pay in Sentell field.)

Caddo Parish: Jones-O'Brien, Inc. and Ralph R. Gilster and Union Producing Co. 1 Pace, 7-14n-16w. IPF 43,000 M.c.f. of gas per day, 63 BC per million, 64°,

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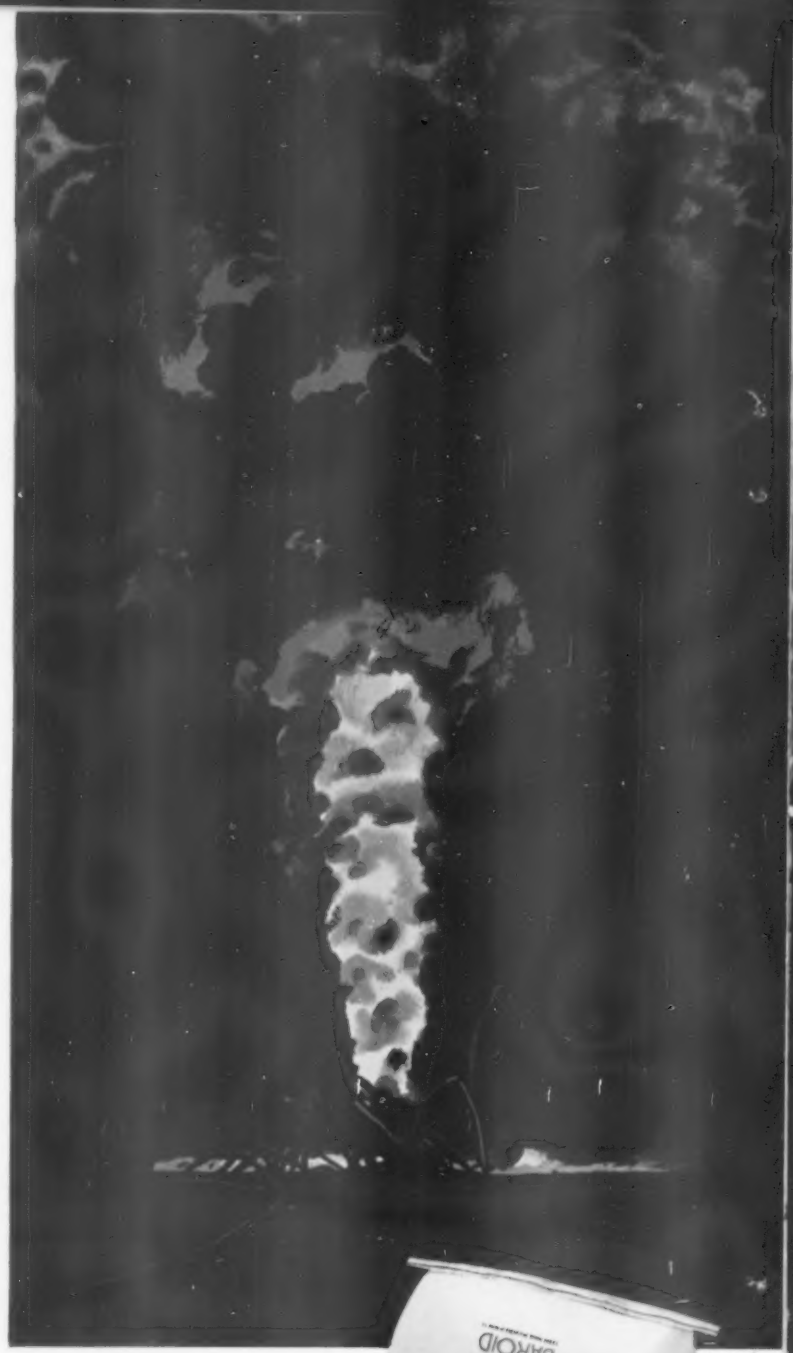

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Pettit 6,135-49 ft., Travis Peak 6,506-14 ft. TD 6,750 ft. (Benthany extension.)

Catahoula Parish: Hunt Oil Co. H-100 La. Delta Hardwood Lumber Co., C SW SE 2-5n-5e. Dry. TD 6,014 ft.

Concordia Parish: E. C. Wentworth and Como Drilling Co. 1 Calvert, C SW SW 26-7n-7e. Dry. TD 6,243 ft.

DeSoto Parish: H. L. Ritter 1 Bell, C NW SE NE 10-11n-13w. Dry. TD 3,010 ft.

Natchitoches Parish: Lee Whitehurts and Carl L. Bryan 1 Thelma Walker et al, 23-10n-8w. Dry. TD 4,001 ft.

ARKANSAS

Clay County: Charles Dorrah 1 Brady, C NW SW NE 32-21n-8e. Dry. TD 850 ft.

Scott County: Critchell Parsons 1 Harper, 27-3n-32w. Dry. TD 3,500 ft.

Union County: A. J. Miller 1 Dumas, 20-17s-15w. Dry. TD 3,375 ft.

OKLAHOMA

Coal County: J. E. Welch 1 Carter, SE NW 10-1s-8e. Dry. TD 1,698 ft.

Garfield County: Zone Oil Co. 1 LeGrange, SW NW NW 8-23n-3w. Dry. TD 2,272 ft.

Grant County: Carter Oil Co. et al 1 Hodges heirs, NE NW NW 23-26n-5w. IPF 210 BOPD, dolomite 5,758-62 ft., 47.2°; 216 BOPD, Marshall 5,796-5,800 ft., 46°, 9/64-in. TD 5,864 ft. (Oil discovery).

Kay County: O. H. Parker 1 Turk, SE NE NE 22-27n-2e. Dry. TD 4,006 ft.

LeFlore County: Hubbell 1 Rind, SE SE SW SW 34-3n-24e. Dry. TD 310 ft.

Lincoln County: Harry J. Schafer-D&L Oil Co. 1 Brown, NW SW NE 15-13n-4e. Dry. TD 4,215 ft.

N. T. Smith 4 Wiedemann, NE NE SE 17-14n-2e. IPF 240 BOPD, Cleveland 3,894-3,913 ft., ½-in. TD 3,928 ft. (New pay at Sunflower field).

Murray County: C. E. McPherson 1 Reed, NE NE SE 2-1n-3e. Dry. TD 800 ft.

Noble County: O. H. Parker 1 Adams, W½ NW NW 3-21n-1e. Dry. TD 5,000 ft.

Anderson-Plank-Arnao 1 Branson, NE NE SW 14-21n-3e. Dry. TD 3,689 ft.

Roy G. Woods 1 McAlister, NE SE NE 35-24n-2e. Dry. TD 4,463 ft.

Osage County: Wiley P. Ballard, Johnson & Gill 1 Osage, SE SE NE 27-25n-7e. Dry. TD 3,100 ft.

Payne County: Gulf Oil Corp. 1 Flora, NW SE NE 17-19n-1e. Dry. TD 5,091 ft.

Pittsburg County: Jelly Reaves Drilling Co. 1-A Walters, SE NW SW 29-7n-13e. Dry. TD 1,692 ft.

Pottawatomie County: Walter H. Gant 1 Crossland, NE NE NW 4-9n-2e. Dry. TD 6,194 ft. temp. abd.

Tillman County: Ulmer & Sons 1 Corbin, SW SW SE 4-1s-19w. Dry. TD 3,002 ft.

KANSAS

Barton County: Northern Pump 1 Schreiber, NW NW NE 34-17s-15w. Dry. TD 3,610 ft.

Comanche County: GMR-Natural Gas & Oil Corp. 1 Jackson, NW NW NW 28-34s-17w. Dry. TD 6,500 ft.

Cowley County: Krisswell Drilling Co. 1 Jarvis, SW SW SW 7-32s-8e. Dry. TD 2,707 ft.

Decatur County: Franco Central 1 Vehlin, NE SW NW 6-2s-27w. Dry. TD 3,961 ft.

Ellis County: Jones, Shelburne & Farmer 1 Potter, NE NE NW 32-11s-16w. Dry. TD 3,447 ft.

Bankoff 1 Sites, NE NE SW 18-11s-18w. Dry. TD 3,540 ft.

Harper County: Beardmore 1 Blick, NE NE NE 28-32s-9w. Dry. TD 4,829 ft.

Norton County: Jones, Shelburne & Farmer 1 Sheldon, SE SE NE 14-2s-24w. Dry. TD 3,702 ft.

Phillips County: D. G. Hansen-C&G Drilling Co. 1 Fox, SE SE SE 17-5s-19w. Dry. TD 3,695 ft.

Pratt County: Deep Rock Oil Corp. 1 Slater, SW SW NE 1-26s-11w. Dry. TD 4,450 ft.

Reno County: Trans-Era and Morris Mizel 1 Knoblauch, SE SE SE 26-26s-5w. Dry. TD 4,126 ft.

NEBRASKA

Banner County: E. L. McElroy 1 Hagemeister, NW NW NE 7-15n-51w. Dry. TD 5,262 ft.

Cheyenne County: Wilcox Oil Co. and Don Rounds 1 Birdwell, SE SE NE 32-17n-50w. Dry. TD 5,000 ft.

Willits & Craig and Don Rounds 1 Williamson, C NE NE 9-16n-48w. Dry. TD 4,595 ft.

Dawes County: Amerada 1 Thies, SW SW SE 22-31n-42w. Dry. TD 1,901 ft. Dakota.

EASTERN NEBRASKA

Richardson County: J. E. Palenski & Sons et al 1 Boose, SE NE SE 28-1n-18e. Dry. TD 2,326 ft.

NORTH DAKOTA

Benson County: Shell 1 Gigstad, NE NW 10-151n-70w. Dry. TD 3,172 ft. Devonian.

Ward County: W. H. Hunt 1 Almy, NW NE 13-155n-82w. Dry. TD 7,299 ft. Interlake.

CALIFORNIA

Glenn County: R. S. Rheem, Operator 1-28 Shell-Reichell, 28-18n-1w. Dry. TD 5,500 ft.

Kern County: Bandini Petroleum Co. 1 West Estate, 3-25s-18e. Dry. TD 1,785 ft.

Elliott, Classen & Mickle 58 S. F. & F. L. Co., 12-25s-19e. Dry. TD 3,742 ft.

Orange County: C. C. Peterson 1 Huntington Beach, 13-6s-11w, IPF 312 BOPD, 18.7° gravity, perfs. 4,286-4,360 ft., TD 4,360 ft. (New fault block pool in "B" zone of Huntington Beach field.)

Santa Barbara County: Union Oil Co. 1 Haslam, 6-10n-34w. Dry. TD 2,839 ft.

Solano County: W. W. Holmes, Operator 1 Liberty Farms, 17-5n-3e. Dry. TD 5,200 ft.

Tulare County: Navy Oil Co. 2 Navy, 8-22s-27e. Dry. TD 1,988 ft.

Verde Oil Co. 1 Janis, 34-22s-27e. Dry. TD 1,380 ft.

Ventura County: C. A. Palmer, Trustee 1 Brandies, 7-2n-17w. Dry. TD 2,500 ft.

Victory Oil Co. 1 Donlon, 24-2n-22w. Dry. TD 7,200 ft.

MONTANA

Daniels County: W. H. Hunt 1 Lindquist, C NW NW 10-34n-49e. Dry. TD 10,063 ft. Winnipeg.

Liberty County, South Chester area: Amerada Petroleum Corp. 1 Kolstad Ranch, SW SW NE 3-30n-4e. Dry. TD 2,485 ft. Madison.

Phillips County, Whitewater Creek: The Chicago Corp. Republic Gas 1 Voernment-U. S. Smelting, SE NW SE 31-35n-31e. Dry. TD 4,664 ft. Devonian.

Rosebud County, North Porcupine: Phillips Petroleum Co. 1 N. P., C SW NW 33-11n-39e. Dry. TD 3,065 ft. Kibbey.

WYOMING

Converse County, South Big Muddy: True & Brown and R. H. Fulton 1 State 11, C NE NE 11-32n-77w. Dry. TD 5,290 ft. Dakota.

1 Glaze-Government, C NE SW 30-33n-76w. Dry. TD 5,433 ft. Dakota.

Fremont County: California Co. 1 Government, SW SW SW 14-30n-95w. Dry. TD 2,525 ft. Madison.

Conant Creek: Hancock Oil Co. 1 State, C N½ NE SE 14-33n-94w. Dry. TD 4,700 ft. Tensleep.

Antelope Unit: Murphy Corp. 1 Unit, NW NW NW 31-27n-94w. Dry. TD 7,568 ft. Nuggett.

Hot Springs County, Lysite Mountain: Blackwell Oil & Gas Co. 1 Lysite, NE NW NE 17-42n-90w. Dry. TD 3,948 ft. Tensleep.

Weston County: Brazell & Wrather 4 State, C SW SW 36-44n-65w. Dry. TD 5,957 ft. Newcastle.

West Mush Creek: James Sloss and S. D. Johnson 1 Cummings, NE SE SE 2-44n-65w. IPF 32 BOPD, Newcastle TD 5,535 ft.

COLORADO

Adams County: Plains Exploration 1 McKenzie, NW NW NW 28-1s-58w. Dry. TD 6,183 ft.

Logan County: British-American 1 Sanders, C SE NE 1-9n-55w. Dry. TD 5,492 ft.

South Texas Development Co. 1 State, C NE NW 24-8n-52w. Dry. TD 4,446 ft.

Moffat County: The Texas Co. 1 Treleaven, NE SW SW 32-5n-95w. IPP 323 BOPD, Morrison discovery, new field. TD 6,819 ft. Sundance.

Morgan County: B. F. Allison 1 Westhoff, SE SE SE 25-5n-58w. Dry. TD 6,057 ft.

Denver Basin 1 Shable, NW NW SE 22-6n-60w. Dry. TD 6,649 ft.

Petroleum, Inc. 1 Graham "D," C SE SW 32-3n-59w. Dry. TD 6,347 ft.

Washington County: Shell Oil Co. 1 Ruhaak, C NE NW 30-2s-51w. Dry. TD 4,300 ft.

Shell 1 Graves, SE NE SW 1-2s-52w. Dry. TD 4,620 ft.

Weld County: Tom Palmer, Inc. 1 State, NW NW NW 2-4n-62w. Dry. TD 6,885 ft.

W. Earl Rowe 1 Melendy, NW NE NW 34-7n-58w. Dry. TD 6,423 ft.

MANITOBA

Madison-A.P. Consolidated 1-19 Lauder, LSD 1, 19-5-24w1. Dry. TD 3,925 ft.

Dome-Harris Cox 12-15 West Ewart, LSD 12, 15-8-29w1. Dry. TD 3,169 ft.

SASKATCHEWAN

Socony-Woodley-Southern 4-15 South Bestville, LSD 15, 4-16-22w3. Dry. TD 3,710 ft.

Hudson's Bay-Canada Southern 3 Denzil, LSD 16, 22-38-25w3. Dry. TD 2,609 ft.

Socony 33-16 Edgell, LSD 16, 33-10-23w3. Dry. TD 4,082 ft.

Amurex-Canada Southern 1-10 Murray, LSD 10, 5-16-27w3. Dry. TD 3,480 ft.

Socony-Woodley-Southern 28-11 East Gull Lake, LSD 11, 28-13-18w3. Cantuar sand oil well. TD 3,981 ft.

Alminex-Hudson's Bay 19-8, LSD 10, 8-30-27w3. Viking gas well. TD 2,420 ft.

Tide Water-Southey 1 Crown, LSD 4, 29-22-18w2. Dry. TD 3,125 ft.

ALBERTA

Western-Alminex 29-10 Chinook, LSD 10, 29-29-7w4. Dry. TD 3,676 ft.

California Standard 1 Grassy Island Lake, LSD 11, 11-32-4w4. Dry. TD 2,920 ft.

Texaco-Hudson's Bay C-2-26 Telfordville, LSD 2, 26-50-2w5. Dry. TD 7,360 ft.

BRITISH COLUMBIA

Pacific 38 Fort St. John, LSD 12, 10-85-21w6. Permo-Penn. gas well. Suspended. TD 5,035 ft.

PERSONALS

Exile is Pleasant

New pipeline executive is ex-chemical engineer

FOR a chemical engineer, Walter H. Davidson has done right well in the pipeline business.

In fact, Davidson has been building and supervising pipelines so long it's hard even for him to recall that he entered the oil business with a slide rule in one hand and a test tube in the other.

The general superintendent, recently named vice president of Transcontinental Gas Pipe Line Corp., can look back on some 30 years in the petroleum industry. During that time he has worked in practically every phase of pipelining.

Shortly after he received his B.S. degree in chemical engineering from Texas A. & M. College in 1924, Davidson took his first job in the oil industry as a junior engineer for Cities Service Co. at Bartlesville, Okla. He seemed to have a successful future ahead of him in the engineering field, for a year later he was promoted to construction engineer for the company's various pipeline, gasoline-plant, compressor-station, and refinery projects at Bartlesville.

In 1930 he left his engineer's post to join Continental Construction Co. at Kansas City. This move started a series of quick transfers from one phase to another in the pipeline industry. Although he didn't realize it at the time, it also started a long voluntary exile from his chosen field of chemical engineering.

The next year he joined Natural Gas Pipe Line Co. at Geneseo, Ill., as district pipeline superintendent. In 1934, he was named general compressor-station superintendent for the firm at Chicago.

Works on Transco line . . . Advancing to assistant superintendent of operations for Natural Gas Pipe Line Co. in 1947, he remained with the firm until 1949. He then joined Fish Constructors as general construction superintendent on Transcontinental Gas Pipe Line Corp.'s 1,840-mile gas system extending from the Gulf Coast to the Eastern Seaboard.

The following year, Davidson became general superintendent of Transco in charge of the line he helped build. His latest promotion came this summer when he was elevated to a vice presidency of that firm. He still holds the job of general superintendent.

Davidson is a nominee for chairman of the American Gas Association's operating section for 1954-55. The election will be held at the A.G.A. convention in Atlantic City in October.

Recently, with officials of five other big-inch pipelines, Davidson was named a consultant by the Petroleum Administration for Defense to make a study on ways to increase pipeline capacity between the Texas Gulf Coast and the industrial East. The study, requested by the Office of Defense Mobilization, also is to determine advisability of a new big-inch gas line which could be converted to oil transmission in case of war.

Davidson is vice chairman of the American Standards Association pressure piping code committee on gas transmission and distribution piping. The committee was set up to revise the A.S.A. code on design and construction of power piping, gas and air piping, oil piping, district heating systems, and refrigeration piping.

Looking back on his many successful years in the pipeline industry, Davidson agrees that his exile from the chemical-engineering field has been a pleasant one.

L. R. Brammer, Jr., has been named production superintendent by **Ralph R. Gilster,** Shreveport independent. Brammer had been serving as district engineer with Midstates Oil Corp at Haynesville, La.

Walter B. Saner has joined Champlin Refining Co. at Enid, Okla., as refining engineer. Saner formerly was with Chicago Corp. as district engineer at Bishop, Tex.

Lincoln F. Elkins has been named chief engineer of Sohio Petroleum Co. Elkins, who joined Sohio in 1947, has been serving as special projects engineer.

M. J. Heald, Jr., has been promoted by White Eagle Oil Co. to district production superintendent with offices at Midland, Tex. Heald formerly was chief engineer.

D. J. Smith has been elected president of American Oil Co., a new wholly owned subsidiary of Standard Oil Co. (Ind.). **L. W. Moore** was elected executive vice president by the board of directors and **Robert E. Wilson,** chairman of the board of Standard, was named board chairman of American. Other officers include: **J. A. Carroll, Jr.,** financial vice president; **R. M. Nash,** vice president and general counsel; **H. C. Smith, A. A. Corona, J. P. Patterson, T. A. Aldridge, H. R. Snow, J. J. Leu,** and **M. L. Schwartz,** vice presidents; **F. X. Mannix,** secretary; **R. W. Arzinger,** treasurer; and **W. M. Scott,** comptroller.

D. J. SMITH

L. W. MOORE

Peter L. Rule has been elected to the board of directors of Royalite Oil Co., Ltd. Rule was elected to succeed **K. M. Pringle,** who has retired.

Paul E. Schauer, former district engineer for Carter Oil Co. at St. Elmo, Ill., has been named staff engineer at Mattoon, Ill., eastern division headquarters. **Jack Simmons** has been appointed to succeed Schauer at St. Elmo.

H. H. Jones, Wichita Falls, Tex., left recently for Israel as superintendent of drilling operations for Pontiac Petroleums, Ltd., which has staked location for its first wildcat 20 miles north of Tel Aviv. Other personnel accompanying Jones included **Leo Marshall,** chief mechanic; **A. C. Newsome,** mud engineer, and **A. C. Smart, L. Vann, Charles McDaniel,** and **Olin Andrews,** drillers. All are from Wichita Falls except Marshall, who is from Fort Worth.

PERSONALS

Walter L. Smith, district geologist in Ely, Nev., for Shell Oil Co., has been elected president of the Eastern Nevada Geological Society.

Arthur Howard, petroleum engineer with Ohio Oil Co., has been transferred from Lovell, Wyo., to Sidney, Neb.

Joseph J. Tumpeer has been appointed senior vice president in charge of the Pioneer Asphalt Division of Witco Chemical Co.

B. C. G. Davis, subsurface geologist with The Texas Co., has been transferred from Tyler to Corpus Christi, Tex.

Robert L. Whiting has been named head of the department of petroleum engineering at Texas A. & M. College. Whiting had been serving as petroleum reservoir engineer for Stanolind Oil & Gas Co. at Tulsa before accepting the A. & M. post. **Dan M. Bass** has been appointed assistant professor of petroleum engineering at Texas A. & M. Bass was formerly employed by Magnolia Petroleum Co. as a petroleum engineer in the West Texas division and for the past 2 years has been with the Texas Petroleum Research Committee doing research on increased oil recovery.

Benson M. (Benny) Kingston, former assistant manager and technical adviser of Chemical Process Co., has opened petroleum engineering and geological consulting offices in Breckenridge, Tex.

Robert L. Anderson, senior administrative geologist with Geophoto Services, Denver, has been promoted to chief geologist. Anderson has been with Geophoto since 1947 and also serves as second vice president of the Rocky Mountain Section of Association of American Petroleum Geologists.

Eugene E. du Pont has resigned as a member of the board of Phillips Petroleum Co. after 35 years of service. Du Pont joined the board in 1919, 2 years after the company was organized. **T. S. Gay,** vice president and assistant secretary in charge of Phillips' New York office, has been named to succeed du Pont.

North Dakota Association Officials Elected

The North Dakota Oil and Gas Association at its second annual meeting held in Bismarck August 16-17 reelected T. N. Jordan, independent operator, Bismarck, for a third term as president and increased the number of vice presidents to four. The officers for the 1954-55 term shown above are, left to right, Allan Eastman, executive secretary; A. A. Mayer, Dakota National Bank, Bismarck, treasurer; Burrel Harrell, Worley & Harrell, Inc., drilling contractors, Williston, vice president; G. Wendell Smith, Smith & Summers, consulting geologists, Bismarck, vice president; Jordan; W. W. Simpson, Skelly Oil Co., Bsmarck, vice president; T. W. Leach, North American Royalties, Inc., Bismarck, vice president, and Ernest R. Fleck, attorney, Bismarck, secretary.

Joe H. Goth, Jr., has been named manager of land and geological operations for Warren-Bradshaw Exploration Co.'s new Rocky Mountain division, with offices in Denver. Goth, who was formerly associated with Continental Oil Co., is a graduate of Lehigh University and University of Pittsburgh in petroleum geology.

Roy M. Young, former petroleum engineer with Ohio Oil Co. at Houston, has been transferred to Bay City, Tex., as petroleum engineer.

John Wilson Johnson has been named production superintendent for **T. E. Bird** at Chanute, Kans. Before joining Bird, Johnson had been production engineer with Cross Laboratories, Inc., at Iola, Kans.

LeRoy Blaylock, independent operator at Dickinson, N. D., has been named temporary chairman of a group of North Dakota independent operators who will determine whether an independent organization would be beneficial to the industry within the state. Committee chairmen appointed include: **Herbert W. Calcote,** Williston, constitution and by-laws; **Arthur V. Seay, Jr.,** Bismarck, membership; and **W. F. Grinnan,** Bismarck, publicity.

W. Joseph Straus and **Samuel Hoffman** have been elected to the board of directors of Devon-Leduc Oil, Ltd.

Dr. Leonard B. Lipson, senior research physicist in Magnolia Petroleum Co.'s field research laboratories in Dallas, has been appointed associate professor of petroleum engineering at University of Houston starting September 1. Lipson will assist in the development of the graduate program and will conduct research in core analysis and well logging.

Edward F. Morril has been named general manager of the new petrochemical division of Standard Oil Co. (Ohio). Morrill has been president of Mid Valley Pipe Line Co. since 1950.

Thomas C. Frick has been named manager of the production division of Atlantic Refining Co. at Dallas. Frick had been regional coordinating manager at Corpus Christi, Tex.

R. A. (Gus) Davis has been named Rocky Mountain division manager for Union-Gulf Oil & Mining Corp., Fort Worth. In addition to an active drilling program, Davis will supervise the development of mineral leaseholds in Utah and New Mexico.

Stephen Rowley has been named assistant to the president of H. L. Rowley, Inc., Shreveport. Rowley will be in charge of the firm's safety program.

PERSONALS

Leland Bundy, daylight tour driller with H. L. Rowley, has been promoted to toolpusher by the firm.

T. E. SWIGART

T. E. Swigart, president of Shell Pipe Line Corp., will retire October 1 after 30 years of pipeline service, including 22 years as an officer of various Shell companies. **Joe T. Dickerson,** vice president in charge of Shell Oil Co.'s Midland, Tex., exploration and production area, has been named president to succeed Swigart, who plans to open a petroleum consulting office in Houston after he retires. Dickerson joined Shell in 1927 and has served in the legal department of the company at Tulsa, St. Louis, Houston, and New York. **J. E. Clark,** production manager for Shell in Denver, will replace Dickerson at Midland.

Fred H. Billups has resigned as president of Standard Oil, S.A., an affiliate of Standard Oil Co. (N. J.), to become president and chief executive officer of Tropical Gas Co., a newly formed firm operating in Bermuda, Puerto Rico, Dominican Republic, Haiti, Jamaica, and Central America.

George H. Link has been promoted to district superintendent by Carter Oil Co. at Carmi, Ill. Link had been serving at Carmi with Carter as district engineer. **John L. Dailey,** who has been serving as assistant engineer, will succeed Link.

Paul C. Evans, who was formerly with Canadian Gulf Oil Co., and West Canadian Petroleum, Ltd., has been appointed manager of operations for Canadian Export Gas, Ltd., and Canadian Prospect, Ltd., with headquarters in Calgary.

Vernon E. Holmes has been named superintendent of production operations of the northwest division of Sohio Petroleum Co. Holmes, who joined Sohio in December 1943, succeeds the late Walter L. McCloy, Jr. **Burton W. Whiteley,** chief engineer, has been transferred to the Gulf Coast division in Houston as superintendent of production operations. Whiteley joined Sohio in December 1945 and served in various engineering positions before becoming chief engineer in March 1949.

H. W. Benischek, chairman of the school of petroleum engineering at the University of Oklahoma, has taken a leave of absence for the 1954-55 academic year and will serve as visiting professor in the department of petroleum engineering at Texas Technological Institute, Lubbock, Tex.

N. A. Rousselot has been named vice president and manager by Seaboard Oil Co. of its newly consolidated western division headquarters office at Denver. The company formerly maintained division offices at Los Angeles and Casper, Wyo. **A. W. Vitt** has been named manager of exploration and **C. B. Kimberline** manager of production of the consolidated division.

Raymond M. Thompson has resigned as manager of exploration for Hiawatha Oil Co. and will open offices as a consulting geologist at Denver.

R. N. Bills, party chief, has been promoted to assistant geophysical supervisor at Houston by Amerada Petroleum Corp.

R. S. Vickers, assistant head engineer with Standard Oil Co. (Ind.), at Whiting, Ind., has been transferred to New York on temporary assignment.

DEATHS

Charles Heman, 61, Fort Worth independent, died there August 19.

Clifford H. Brown, 56, independent oil operator at Dallas, died August 19 in Jacksonville, Fla.

Amos W. Shumway, 68, manager of the service department of Signal Oil & Gas Co. died August 16 in a Los Angeles hospital.

J. C. Creede, 63, production superintendent for Skelly Oil Co. at Carmi, Ill., died in a hospital there recently following a short illness.

Charles W. Duncan, 57, died August 18 in Los Angeles. Duncan was northern division manager for Richfield Oil Corp. and was in Los Angeles to attend a company meeting when he died.

Fred T. Haddock, Sr., 66, Tulsa independent oil operator, died August 23 at his home following a heart attack. Haddock was widely known through the Southwest and held properties in Oklahoma, Kansas, Arkansas, and Texas.

W. W. Bruce, 72, retired executive vice president of Continental Oil Co., died August 21 in a Ponca City, Okla., hospital. Bruce served 18 years with The Texas Co. before joining Continental in 1929 as secretary and assistant to the president. He was named vice president in 1929 and was promoted to executive vice president the same year. In addition to his duties as executive vice president, he also served as president of Continental Steamship Co., a subsidiary of Conoco.

Myer L. Roberts, 45, president of Keystone Drilling Co. of Miami, Okla., was killed in an airplane crash August 22 at Mason City, Ia.

William Zurn Savage, 58, independent oil operator, died August 24 in a Tulsa hospital after suffering a heart attack. Savage started in the oil business in Tulsa in 1918 and was associated for awhile with his father-in-law, the late Charles Grant Tibbens, in Tibbens Oil Co.

George W. Hanneken, 73, former vice president and director of Standard Oil Co. (Ohio), died August 17 in his home in Cleveland. Hanneken joined Standard in 1917 after originally beginning his petroleum career with the old Standard Oil Co. (Kansas). In 1939 he was elected a vice president of Sohio and in 1940 became a director. Hanneken was a member of the general committee of the American Petroleum Institute and during World War II he served with the Petroleum War Council.

George H. Taber, Jr., 64, who retired as president of Sinclair Refining Co. in 1948, and who was associated with the firm for more than 30 years, died August 20 in Rye, N. Y. Taber began his career with Sinclair in 1917 and served as manager of the natural-gasoline department, vice president of Sinclair Oil & Gas Co., president of Sinclair Crude Oil Purchasing Co., and vice president in charge of refining operations for Sinclair Refining Co. before being elected president. In addition to his executive duties, Taber developed and patented many improvements in petroleum refining.

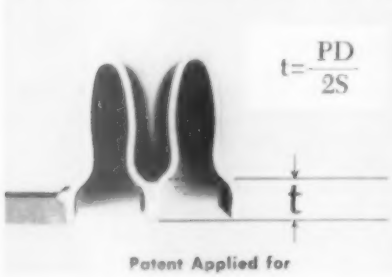
Sola-Flex expansion joints meet petrochem industrial needs

IN THE UNUSUAL installation pictured above, the vertical pipe equipped with Sola-Flex joint at either end is 10 stories in the air and is suspended with counter weight spring hangers which support the 12,000 pound dead weight.

Sola-Flex expansion joints are now used and endorsed by all major oil companies, and fully conform with the API-ASME Codes.

Unique construction of the Sola-Flex U-span joint provides built-in stress rings as illustrated in the sketch below where $t = \frac{PD}{2S}$. This fully integrated design eliminates the need for separate external supports.

Sola-Flex catalogs offer a complete range of sizes in standard expansion joints, convoluted couplings and special designs to meet high or low pressure requirements. Customers can also depend on Solar engineering skill for the development of custom designs to solve special problems.

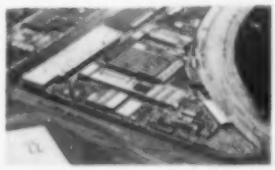


Patent Applied for

SOLAR AIRCRAFT COMPANY

This is What Solar Offers You

Solar specializes in the manufacture of precision products from alloys and special metals for severe service. Solar's experience since 1927 is unduplicated in this field. Solar skills and facilities range from research, design and development through to mass production. Wherever heat, corrosion or specifications are problems, Solar can help you solve them.



PLANTS. *In San Diego (Photo above) and Des Moines. A total of 1,400,900 sq. ft. floor space. Approximately 5,000 employees. Annual sales over $65,000,000.*

EQUIPMENT. *Production equipment for alloy and super metal fabrication—forming, machining, welding, brazing, casting, coating. Extensive laboratory and testing equipment. Facilities for development, prototype, limited or mass production.*

SERVICES. *Research, design, development, tooling and production engineering staffs. Experienced with all alloy steels, stainless alloys, super alloys, and Titanium and its alloys. Government source inspection and Solar quality control meet rigid aircraft and commercial standards.*

CONTRACT PRODUCTION

Current orders include aircraft engine and airframe parts, alloy castings, pneumatic ducting, atomic energy components. Customers include some of the most honored names among aircraft and industrial manufacturers in U.S. and Europe.

SPECIAL PRODUCTS

Bellows. *"Sola-Flex" Bellows and Expansion Joints in many designs from ½" up to probably the world's largest, 28 feet in diameter.*

Gas Turbines. *Solar "Mars" 50 hp unit for auxiliary generator sets, portable fire pumps. Solar "Jupiter" 500 hp engines in variable and constant speed models.*

Ceramic Coatings. *"Solaramic"® is the Solar trade mark for a family of coatings that protects metals from heat, corrosion, galling and abrasion.*

Controls. *Complete control systems utilizing the new Solar "Microjet"® principle for control of gas turbines, jet engines and pneumatic devices.*

FURTHER INFORMATION

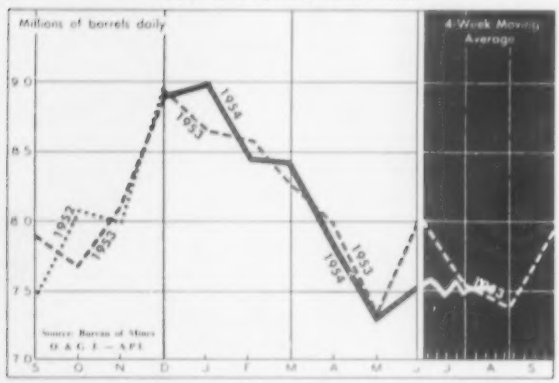
Your inquiry regarding any Solar service or facility will receive courteous attention. Address Solar Aircraft Company, Department A-13, San Diego 12, Calif.

Latest Figures . . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,164,050	UP	16,200	DOWN	437,197
Crude stocks	279,824,000	DOWN	4,000	DOWN	321,000
Completions	1,065	DOWN	9	UP	45
Refinery runs	6,936,000	UP	201,000	DOWN	173,000
Gasoline stocks	155,017,000	DOWN	1,311,000	UP	14,506,000
Four-product stocks	356,139,000	UP	3,280,000	UP	18,255,000
Total imports	931,800	UP	15,300	UP	105,100

TOTAL DEMAND—ALL OILS



Comparing Current Stock Trends With Last Year Can Be Misleading

WARNING—Don't use records of changes in gasoline stocks during the summer of 1953 as a measure of the progress being made toward the solution of the stock problem.

To say that we are doing better than last year is like trying to justify the poor showing of a race horce by saying that he did better than the nag that ran the wrong way.

Gasoline stocks increased 2,170,000 bbl. during August last year. There should have been a stock reduction of at least 10,000,000 bbl.

Instead of comparing current gasoline stock reductions with last year, refiners should watch the figures for progress toward the desirable goal of only 130,000,000 bbl. in storage at the end of the gasoline season.

If refinery runs between now and the end of September can be held to an average of about 6,750,000 bbl. daily with refinery yield of gasoline cut to 43.5 per cent, gasoline stocks can be pulled down to reasonable levels by the end of the driving season.

For the month of September, no additions to crude inventories will be needed, so the ideal crude-supply level would be one that just meets demand for refinery runs, exports, transfers, and losses.

Exports of crude may average about 30,000 bbl. daily, and transfers plus losses will amount to about 40,000 bbl. daily. This total of 70,000 bbl. daily plus runs of 6,750,000 bbl. daily will result in a total demand for all crude amounting to about 6,820,000 bbl. daily.

Reports by refiners to the Texas Railroad Commission indicate that imported crude is scheduled at about 620,000 bbl. daily for September. If this average cannot be reduced, domestic production can average only about 6,200,000 bbl. daily without increasing crude inventories.

If both production and runs are increased, the motoring season will end with too much gasoline in storage tanks.

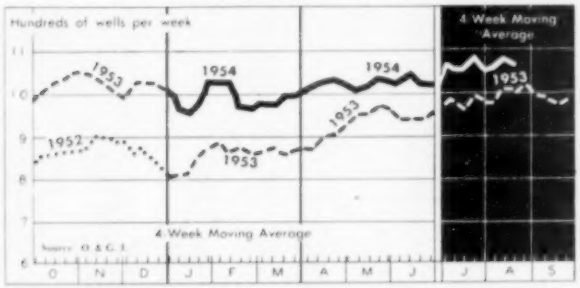
Markets still soft . . . The better tone in gasoline markets of the Mid-Continent and the Middle West and adjoining areas reported earlier in the month was not so apparent over the past week. There appeared to be an excess of supplies in all the principal consuming centers and occasional price shading under the general price levels became effective.

The principal weakness centered in the Chicago and Twin Cities areas where buyers have offers from several refining centers and from product pipeline and water terminals. Some observers felt that price situation might stabilize or improve provided the Gulf Coast market continued steady.

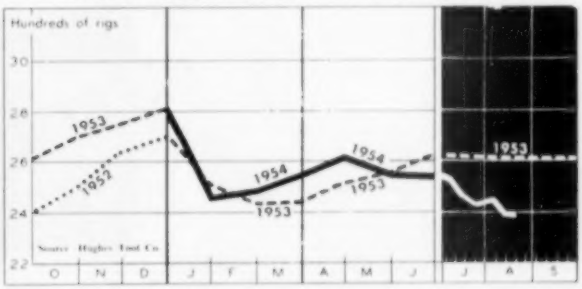
The recent advances of .7 to .9 cent per gallon in tank wagon and retail gasoline quotations in eastern states have become generally effective and this has been reflected in firm barge prices.

The interior refining centers all report an improved market situation in residual fuels. Some sellers in Oklahoma (Group 3) have advanced their price from $1.15 to $1.20 per barrel.

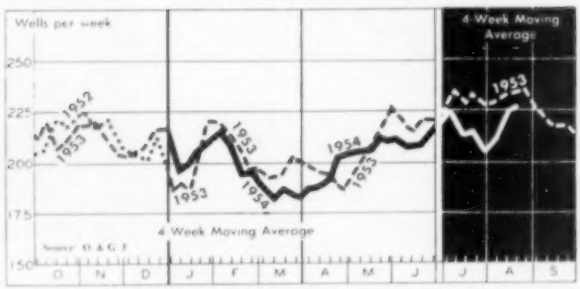
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS

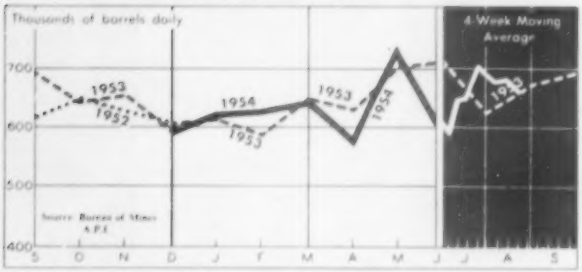
Area—	8-23-54	Change from 8-16-54	Change from 8-24-53
Gulf Coast	496	— 8	— 85
N. and W. Texas-New Mexico	739	— 6	— 43
Arkansas-N. Louisiana-E. Texas	173	7	27
Oklahoma	295	— 4	— 68
Kansas-S. Nebraska	183	14	25
Illinois-Eastern	123	— 6	— 20
Rocky Mountain	258	— 4	
Pacific Coast	122	1	— 45
Total United States	2,389	— 6	—209
Western Canada	145	5	— 28

WEEKLY WELL COMPLETIONS . . . WEEK ENDED AUGUST 21, 1954

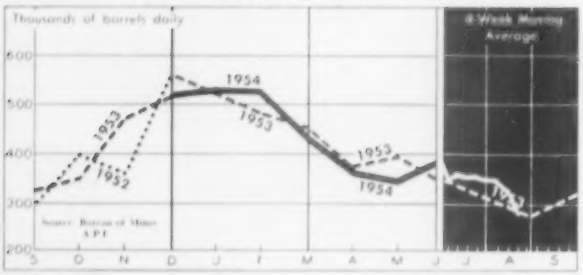
	Total of all wells: Comp.	Oil	Gas	Dry	Footage	Cum. 1954	Cum. 1953	Wildcat completions and discoveries: Oil	Dist.	Gas	Dry	Total	Cumulative total, 1954: Oil	Dist.	Gas	Dry	Total
Ala.-Ga.-Fla.	1	0	0	1	6,181	72	92	0	0	0	1	1	2	0	2	61	65
Arkansas	9	4	0	5	24,695	406	323	0	0	0	3	3	17	0	4	76	97
California	40	30	0	10	197,838	1,538	1,646	1	0	0	9	10	41	1	8	332	382
Colorado	22	7	0	15	125,269	839	425	1	0	0	10	11	24	0	11	321	356
Illinois	57	32	0	25	127,381	1,808	1,184	0	0	0	6	6	6	0	0	230	236
Indiana	14	8	0	6	17,346	491	816	0	0	0	5	5	5	0	0	92	97
Kansas	98	45	11	*42	330,199	2,921	3,164	0	0	0	11	11	50	0	14	385	449
Kentucky	24	8	8	8	56,863	720	687	1	0	0	4	5	12	0	3	75	90
Louisiana	72	49	6	17	369,791	2,207	1,675	1	0	3	10	14	73	39	26	217	355
North	45	36	2	7	102,428	1,204	691	0	0	2	4	6	11	3	10	86	110
South	27	13	4	10	267,363	1,003	984	1	0	1	6	8	62	36	16	131	245
Michigan	6	1	0	5	8,067	350	375	0	0	0	0	0	12	0	0	137	149
Mississippi	9	4	0	5	50,479	263	241	1	0	0	3	4	7	0	0	92	99
Montana	6	1	0	5	31,962	196	255	0	0	0	4	4	3	0	1	59	63
Nebraska	11	4	0	7	56,806	245	219	0	0	0	4	4	15	0	3	79	97
New Mexico	19	11	7	1	99,007	698	895	0	0	2	1	3	12	0	14	70	96
North Dakota	5	3	0	2	36,611	183	168	0	0	0	2	2	4	0	0	67	71
Ohio	19	8	4	*7	32,301	734	676	0	0	0	0	0	3	0	4	9	16
Oklahoma	143	89	6	†48	467,825	5,939	4,732	2	0	0	14	16	76	3	18	416	513
Pennsylvania-New York	43	16	12	‡15	70,982	1,525	1,606	0	0	0	0	0	0	0	5	26	31
Texas	429	229	34	166	1,987,859	11,957	11,100	12	0	14	107	133	533	50	120	2,720	3,423
Southwest (1 & 4)	68	31	10	27	330,278	1,710	1,799	1	0	5	19	25	74	23	32	470	599
Gulf Coast (2 & 3)	52	25	5	22	349,591	1,734	1,634	1	0	1	11	13	56	22	37	429	544
East (5 & 6)	23	10	5	8	109,653	621	521	1	0	4	7	12	9	0	13	183	205
North Central (7-B & 9)	152	70	2	80	492,507	4,496	4,209	5	0	2	42	49	248	4	15	1,100	1,367
West (7-C & 8)	107	81	2	24	621,088	2,765	2,417	4	0	2	23	29	144	0	16	476	636
Panhandle (10)	27	12	10	5	84,742	631	520	0	0	0	5	5	2	1	7	62	72
Utah	0	0	0	0	0	47	47	0	0	0	0	0	3	0	1	24	28
West Virginia	14	2	9	3	42,597	361	387	0	0	1	0	1	0	0	19	10	29
Wyoming	24	15	0	9	147,449	851	443	1	0	0	7	8	28	0	4	124	156
Miscellaneous	0	0	0	0	0	87	43	0	0	0	0	0	2	0	0	19	21
Total United States	**1,065**	566	97	402	4,287,508	34,438	31,199	20	0	20	201	**241**	928	93	257	5,641	6,919
Total previous week	1,074	593	76	405	4,252,264			43	0	14	172	229	908	93	237	5,440	6,678
Total August 22, 1953	1,020	510	88	422	4,155,761			31	3	12	209	255	949	73	253	5,834	7,109

Service wells included: *1, †3, ‡13.

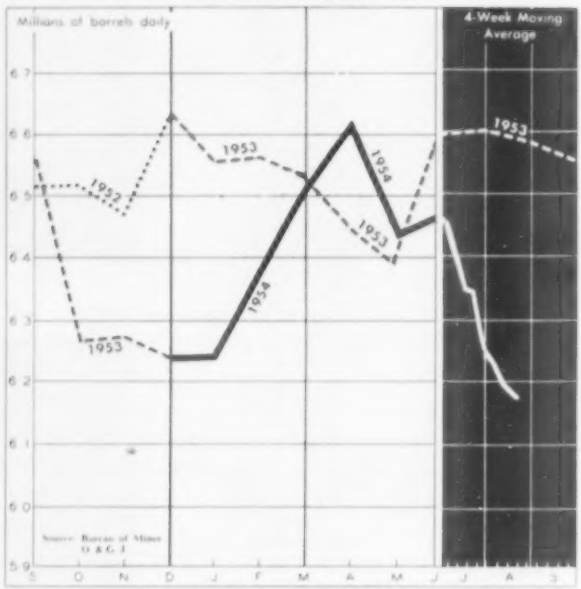
CRUDE IMPORTS



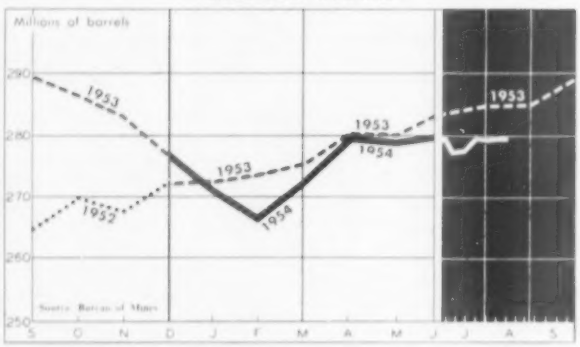
PRODUCT IMPORTS



CRUDE-OIL PRODUCTION



CRUDE-OIL STOCKS



DAILY AVERAGE PRODUCTION FOR WEEK

	August 21 Crude oil	August 21 Lease condensate	August 21 Total	Aug. 14 total
Alabama	4,400		4,400	4,300
Arkansas	75,400	500	75,900	76,950
California	974,600		974,600	975,000
Colorado	128,700		128,700	128,300
Eastern	55,100		55,100	55,100
Florida	1,500		1,500	1,500
Illinois	180,600		180,600	185,300
Indiana	28,700		28,700	28,600
Kansas	329,300		329,300	320,400
Kentucky	35,800		35,800	35,600
Louisiana	601,400	38,150	639,550	639,350
North	107,400	3,000	110,400	110,200
South	494,000	35,150	529,150	529,150
Michigan	32,800		32,800	32,100
Mississippi	87,750	3,000	90,750	90,100
Montana	41,100		41,100	37,400
Nebraska	19,400		19,400	19,600
New Mexico	206,050	1,650	207,700	207,600
Oklahoma	500,100		500,100	492,200
Texas	2,508,000	44,650	2,552,650	2,552,650
Dist. 1	41,200	350	41,550	41,550
Dist. 2	123,300	5,550	128,850	128,850
Dist. 3	400,000	22,200	422,200	422,200
Dist. 4	220,000	5,200	225,200	225,200
Dist. 5	42,000	250	42,250	42,250
Dist. 6	105,000	4,600	109,600	109,600
East Texas field	205,000		205,000	205,000
Dist. 7-B	125,000	25	125,025	125,025
Dist. 7-C	170,000	4,500	174,500	174,500
Dist. 8	814,000	1,800	815,800	815,800
Dist. 9	179,000	150	179,150	179,150
Dist. 10	83,500	25	83,525	83,525
Utah	3,800		3,800	4,800
Wyoming	247,500		247,500	246,800
North Dakota	‡14,100		‡14,100	‡14,200
Total U. S.	6,076,100	87,950	**6,164,050**	6,147,850
Change from previous week, up			**16,200**	
Canada	†312,775		†312,775	†281,025
Total U. S. production January 1-August 21			1,487,301,050 bbl.	
Same period last year (crude plus cond.)			*1,521,724,844 bbl.	

*Includes 21,276,950 bbl. condensate. †Week ended previous Monday. ‡Includes S. D. 200.

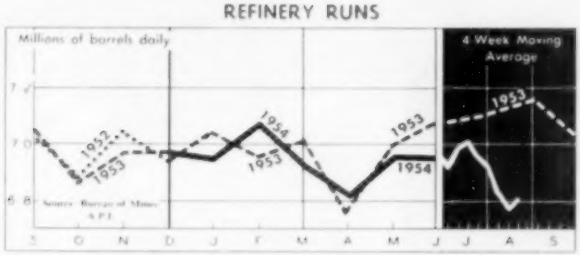
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

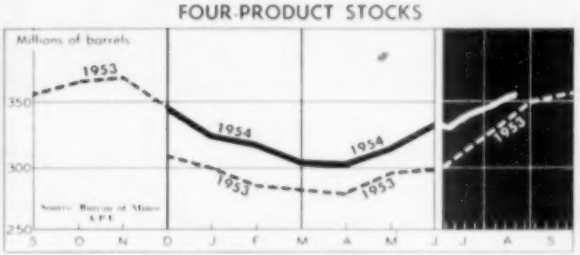
	Aug. 14, '54	Aug. 7, '54	Aug. 15, '53
Pennsylvania Grade	3,106	3,034	2,715
Other Appalachian	1,743	1,804	2,253
Illinois, Indiana, Michigan	12,379	12,787	12,261
Kansas	9,704	9,707	9,142
Oklahoma	25,994	25,373	30,337
Arkansas	3,184	3,273	2,934
Louisiana	16,829	17,376	16,711
North	2,668	2,542	2,884
Gulf	14,161	14,834	13,827
Mississippi	3,071	3,246	3,515
New Mexico	8,749	8,825	8,165
Texas	132,097	132,080	132,100
East Texas proper	11,618	11,895	11,149
West Texas	57,942	57,527	58,681
Texas Gulf	27,653	27,782	28,052
Other Texas	34,884	34,876	34,218
Wyoming	13,497	13,531	13,815
Other Rocky Mountain	5,175	4,893	3,182
California	33,464	33,017	33,031
Foreign	†10,832	10,882	9,984
Total	279,824	279,828	280,145

*Bureau of Mines. †Includes 2,601,000 bbl. in California.

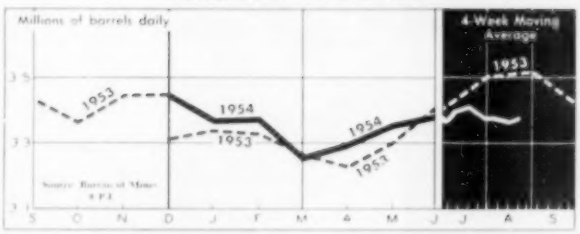
REFINERY RUNS



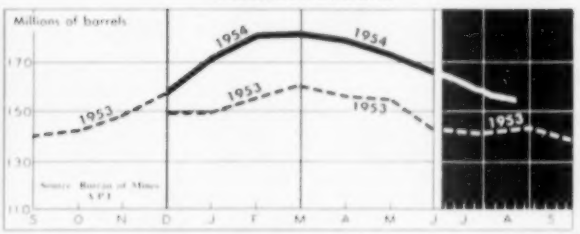
FOUR-PRODUCT STOCKS



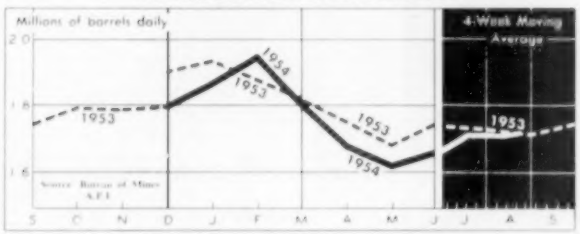
GASOLINE PRODUCTION



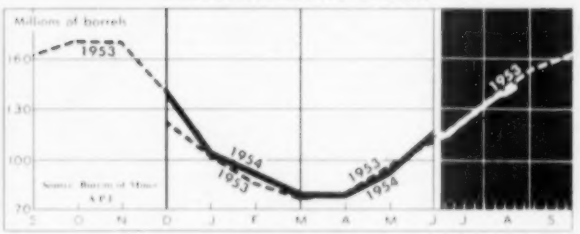
GASOLINE STOCKS



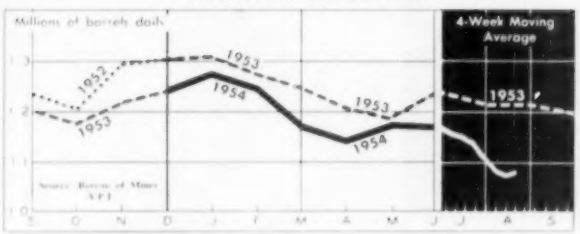
MIDDLE-DISTILLATE PRODUCTION



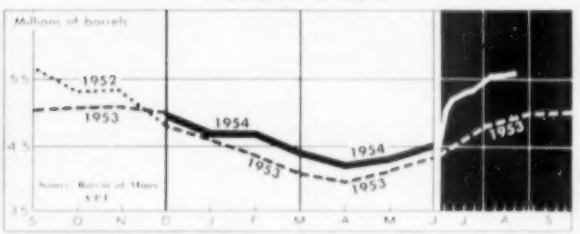
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



A.P.I. REFINERY REPORT, AUGUST 20

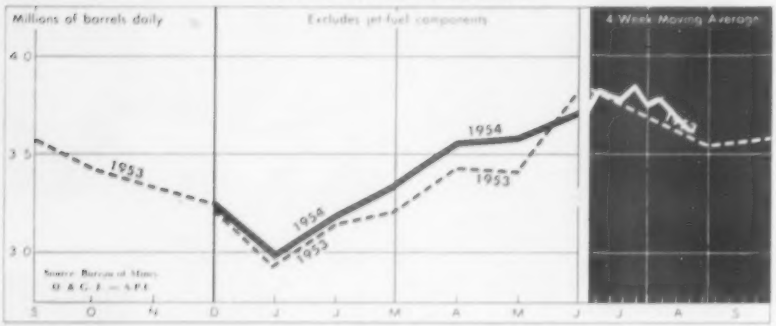
(Excludes all jet-fuel components)

(Thousands of barrels)

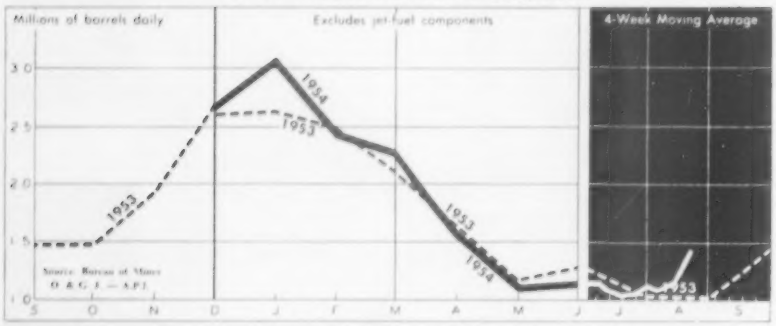
District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, August 1953—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,084	449.4	30.0	261.0	225.9	34,632	13,408	37,096	11,695	1,073	438.7	34.2	251.7	227.4
Appalachian:														
District 1	104	46.3	5.4	21.4	8.7	4,015	589	1,773	456	99	42.1	3.9	18.6	10.6
District 2	71	45.3	4.1	9.1	10.4	2,582	445	767	326	93	52.9	6.7	9.8	11.8
Ind., Ill., Ky.	1,251	673.1	65.6	230.3	143.0	36,161	8,584	23,008	4,778	1,351	740.9	79.4	231.3	168.2
Okla., Kans., Mo.	576	328.9	12.6	123.2	41.1	15,392	2,053	11,622	1,165	642	361.9	21.5	144.4	47.5
Inland Texas	239	175.4	9.8	45.0	21.1	5,636	449	2,024	1,298	266	188.4	8.8	43.1	34.0
Texas Gulf Coast	1,656	802.0	110.6	371.6	222.0	18,407	3,892	13,152	6,062	1,658	828.8	111.5	374.4	240.2
La. Gulf Coast	597	277.3	52.8	188.7	40.0	8,728	2,805	5,101	1,379	551	290.2	40.5	136.4	52.0
N. La. and Ark.	87	34.3	7.6	23.7	4.9	4,051	912	1,383	106	86	33.3	6.3	19.9	4.8
Rocky Mountain:														
New Mexico	19	12.1	1.0	3.0	2.9	233		72	33	21	12.7	0.5	3.5	3.1
Other Rocky Mtn.	249	114.3	2.3	60.0	40.4	6,777	274	2,560	882	260	123.1	3.0	53.5	40.5
California	1,003	445.3	8.3	128.9	370.6	18,403	419	12,886	27,668	1,063	478.5	4.3	150.1	382.3
Aug. 20, 1954	6,936	3,403.7	310.1	1,465.9	1,131.0	155,017	33,830	111,444	55,848	7,163	3,591.5	320.6	1,436.7	1,222.4
Aug. 13, 1954	6,735	3,363.6	275.1	1,437.9	1,085.3	156,328	33,105	107,753	55,673					
Aug. 22, 1953	7,109	3,523.4	310.0	1,463.3	1,279.4	140,511	33,227	113,302	50,844					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

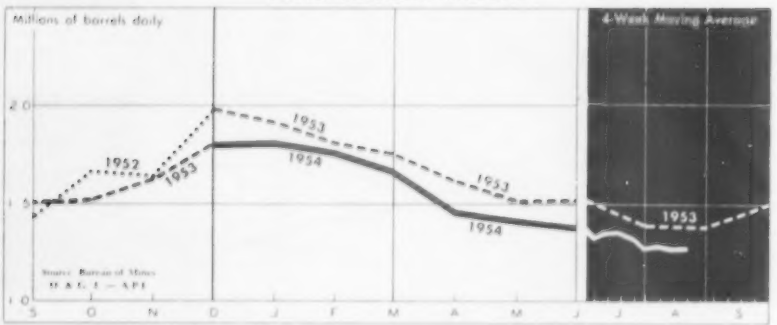
TOTAL GASOLINE DEMAND



TOTAL MIDDLE-DISTILLATE DEMAND



TOTAL RESIDUAL DEMAND



REPRESENTATIVE QUOTATIONS

Spot-market quotations of leading suppliers as of August 25, 1954. Prices are in cents per gallon, except for residual in dollars per barrel and wax in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.5-11	11.25-12	10.50-10.75
Premium gasoline	11.5-12.0	13-13.75	11.50-11.75
42-44 w.w. kerosine	9-9.25	9.70-9.95	8.75-9
No. 2 straw fuel oil	8.25-8.5	8.95	8.25-8.5
No. 6 residual	$1.15-1.20	$2.05-2.25	$1.85-1.95

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4.5	4.0	4.25
Grade 18-55	5.4	4.8	5.15

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18
200 vis., No. 3 neutral, 0-10 pp.	13.25

WAX

Mid-Continent

132-134 A.M.P.	6.0

• The market firmness in gasoline continued on the East Coast and Gulf Coast. Recent advances in those areas are now generally effective in tankwagon and retail markets. In contrast tank-car gasoline markets in the Mid-Continent and Middle West are generally termed "unsatisfactory" or "sloppy."

PRODUCTION AND DEMAND—MAJOR PRODUCTS

(Thousands of barrels daily)

	Refinery prod.	Total demand
Gasoline:		
Four weeks ended 8-20-54	3,373	3,633
June 1954	3,379	3,894
July 1953	3,501	3,690
August 1953	3,517	3,544
Middle distillate:		
Four weeks ended 8-20-54	1,728	1,184
June 1954	1,705	1,159
July 1953	1,735	1,035
August 1953	1,724	1,031
Residual fuel:		
Four weeks ended 8-20-54	1,086	1,269
June 1954	1,123	1,349
July 1953	1,224	1,390
August 1953	1,222	1,411

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87			
15-15.9	1.93			
16-16.9	1.99			
17-17.9	2.05			
18-18.9	2.11			
19-19.9	2.18			
20-20.9	2.24	$2.50		$2.37
21-21.9	2.30	2.52		2.39
22-22.9	2.37	2.54		2.41
23-23.9	2.45	2.56		2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9		2.76	3.09	2.63
34-34.9		2.78	3.11	2.65
35-35.9		2.80	3.13	2.67
36-36.9		2.82	3.15	2.69
37-37.9		2.84	3.17	2.71
38-38.9		2.86	3.19	2.73
39-39.9		2.88	3.21	2.75
40 and above		2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices east of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective May 20, 1954.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	3.00-3.26
Middle District	3.20
Southwest Pennsylvania	2.81
West Virginia	2.75
Ohio	2.74
Illinois Basin	2.90-3.02

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LOADING RACK FOR SALE. 1—10 car steel walkway for loading rack, knocked down, good as new condition. Also one 9000 barrel steel riveted storage tank, erected, in good condition, suitable for re-erection. If interested in above, can make very attractive price on same. OIL FIELD SALVAGE COMPANY, Breckenridge, Texas.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.
H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

GASOLENE PLANT *FOR SALE*

Our Arkansas City, Kansas, Gasolene Plant is available for purchase and removal by January 1, 1955. Inventory and price upon request.

Cities Service Oil Company
PATRIDGE, BARTLESVILLE, OKLAHOMA

PLANT LIQUIDATION

8—Stainless steel columns: 8' x 61', 7' x 25', 6' x 64', 6' x 45' 850#, 4' x 110', 4' x 70', 2' x 73', 2' x 39'.
9—Steel columns 7'6" x 56', 7' x 42', 7' x 5', x 70', 6' x 63', 5' x 62', 4' x 72', 3'6" x 63', 2'6" x 60', 2' x 75'.
2—1440 sq. ft. 304 SS exchangers.
2—1125 sq. ft. steel heat exchangers, 850#.
9—Kettle type reboilers, steel & SS 1250, 1125, 750, 660, 400 & 340 sq. ft.
58—Atmosphere heat exchanger units, 304 SS, 715, 477, 358 & 108 sq. ft.
60—Turbine driven centrifugal pumps, SS & Steel, 1" x 1" to 8" x 8".
2—6-stage Pacific pumps 730 GPM.
2—Clark MA-4 150 BHP engines.
2—Union Iron Works 30,000#/hr. water-tube boilers 240 PSI complete.
2—Oliver 8' x 10' Rot VAC Filters.
Bird 36" x 50" Centrifuge.
5' x 12', 4' x 6' Drum Flakers.

Detailed circular upon request.

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4101 San Jacinto St., Houston 4, Texas, Justin 6052
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WELL DRILLING EQUIPMENT. New and used spudders, rotaries, core drills. Tools, pipe, cable. Everything for well drilling. Fishing tools rented. Pressey & Son, Pueblo, Colo.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

WILSON ATLAS. Sales Price—$21,000.00. Equipped with two L1-600 Cummins Diesel Engines in good condition: includes pump drive, 12 PD groove sheave and V-belts. One American cathead and one plain spool cathead. Compound enclosed oil-bath. Includes one 1000 gal. fuel tank. Contact Cardwell, Houston.

USED MODEL NB-30, 4-sheave Emsco traveling block with #460 B/J hook attached, rated at 100 tons capacity. Reasonably priced. Mountain Iron, Wichita, Kansas, L-D 229.

WILSON GIANT—Serial No. 6383. Sales Price—$5,000. Equipped with Two Waukesha 145 GK Engines in good condition. General Appearance—Fair. Rig used for Work-Over. Price includes Kelco Spinning and Foster Breakout Catheads; Stromberg-McCreary Air Starters on Engines. Brakes circulating water-cooled; Manual Friction Clutches in Transmission; Others—Jaw Clutches. Rig has Slush Pump Drive and Rotary Drive. Location of Unit—Lake Charles, Louisiana. Contact Cardwell, Houston.

FOR SALE
INGERSOLL-RAND
GAS ENGINE DRIVEN COMPRESSORS

1—	XVG-8	—350 H.P.
1—	XVG-6	—250 H.P.
1—	XVG-4	—150 H.P.

ANY COMBINATION COMPRESSOR CYLINDERS. SPECIFY INLET AND DISCHARGE PRESSURES. PROMPT DELIVERIES.

EARL E. KNOX COMPANY
TELEPHONE: 2-5204
BACON STREET, ERIE, PA.

FOR SALE EQUIPMENT

TWO R. L. CARDWELL Double-Drum Spudders with 85-ft. 4-leg masts, one with 185 hp. W.A.K. and other with 145 hp. G.A.K. Waukesha motor. Draw works and motors recently overhauled. Dog houses, small tools. Machines running at present. Reason for selling, ill health. S. R. Lesseig, GA 7-1932 or P. O. Box 6206, Okla. City or W. D. Cunningham, 89K4, Alma, Okla.

FOR SALE: New and used Drilling Engines, 110, 140, 170 and 205 HP, Gas, Gasoline or Diesel; Under-Road Boring Machines; Generating Sets 3 KW to 300 KW. Young Engine Corp., Canton, Ohio. Rep.: A. E. Avers, Box 606, Tulsa, Okla.

250 KW Westinghouse Electric Generator Set, powered by 300 hp Sterling Natural gas engine, direct connected, 440 V, 3 ph, 60 cy, AC, excellent condition. Mounted unit: steel base, price $6000. W. A. Caplis, Box 1312, Shreveport, La. Ph. 2-5312 nights.

FOR SALE

Thermal cracking refinery complete with lead plant 1250 barrel capacity presently operating manufacturing regular and premium gasolines, tractor fuel, diesel fuel and fuel oil. Located T&NO Railroad four miles from Lafayette, La. Population 40,000.
BREAUX BRIDGE OIL REFINING CO., INC.
P. O. Box 356, Breaux Bridge, La.
Telephone 7126

GASOLINE PLANT *FOR SALE*

Gasoline Plant, located in Brazoria County, Texas, shut down in January, 1954. Had been processing approximately thirty-three million feet of gas daily with absorber pressure approximately six hundred thirty pounds. Plant recovered Propane, Butane, Gasoline, Kerosene and Diesel Oil. Adequate storage tanks for all products. Drum Lead Blending Plant. Detailed inventory available upon request.

SOUTHERN PRODUCTION CO., INC.
P. O. Box 670, Ft. Worth, Texas

FOR SALE
EMSCO GB 800 RIG

This rig fully equipped with many extras. Less than 45,000' of hole drilled with rig and accessories since new. Inventory includes grooved drum, dynamatic brake, heavy duty mast, 12 foot substructure. 2 pumps including Gardner-Denver 800 H.P. GXR, 3 LRDU Waukesha Diesel Engines, Steel Mud Tanks, 4½" Grade E Hand Banded Drill Pipe, 6¼" and 7¾" Drill Collars. This rig is priced right. For details contact

BOX H-307, THE OIL AND GAS JOURNAL, Tulsa, Oklahoma

FOR SALE EQUIPMENT

ONE PORTABLE RIG, capable of 1000 foot with 4½ inch drill pipe. Powered with D318 Caterpillar, 2400 hours actual. Approximately 800 foot 4½ inch drill pipe. 41 foot hydraulic lift derrick. Tandem truck with winch. IHC water truck. C. H. W. Drilling Co., Elkhart, Kansas.

FRANKS MODEL 5000 Spudder—Serial No. 866. Sales Price—$7,500. Equipped with one Cummins H51-600 Engine in good condition. Brake Rims in fair condition; Brake blocks—Good. General appearance—Good. Chains—Good. Basic Machine equipped with Spudding attachment, Skid and 65' Double Leg Pipe Mast with 8⅝" and 7" Pipe Legs. 4-Sheave Crown of Wilson Manufacture. Price includes Mast Guy Lines. Location of Unit — Western Kansas. Contact Cardwell, Wichita.

FOR SALE: Model "K" Cardwell tubing and rod unit complete with tubing and rod tools, mast, mounted on Ford tandem truck. Melco Drilling Company, Seminole, Oklahoma.

FOR SALE—TD-18 International Dozer with 12' blade. Good condition and ready to go. Located near Artesia, New Mexico. $5,000.00. Contact Malco Pipeline Company, Inc., Attention. F. E. Smith, Box 660, Roswell, New Mexico.

FOR SALE TO SETTLE ESTATE: Nat'l. 150 Drilling Rig with 2 new #1879 Buda Engines, 7½ x 14 Oilwell PHD pump, 94' L. C. Moore Mast, 17½ Oilwell Rotary Table, #60 Oilwell Swivel, new kelly, 3500' new 4½" Drill pipe, Tool House with light plant, weight indicator, mud gauge and hand tools, 3 pipe baskets. Ready to go. Write or call: Dallas Cline or P. M. Cline, Mt. Carmel, Illinois.

EIGHT CONTINUOUS Chillers with ammonia coils and agitators, Max B. Miller and Company. Vertical—10' x 30' tangent to tangent, 2'-9" skirt, riveted ⅜" shell, ½" heads, capacity—430 barrels, tubes—2.225" of 2" pipe, tube surface—1,414 sq. feet. Service-chilling oil, excellent condition. Will entertain offer for vessels less coils. Oklahoma Iron and Metal Company, Ponca City, Oklahoma.

100 TON LOCOMOTIVE DIESEL-ELECTRIC

1,000 Hp. American-General Electric

Very Good Condition

Manufacturers Equipment Co.

1879 E. 18th St. Cleveland, O.

FOR SALE

Complete Rotary Rig equipped with U-10 Draw Works, 2 WAK Waukesha Motors, 7¼" x 14" P-HD Oil Well Pump Unitized with LRO Waukesha and 6" x 12" Oil Well Pump Driven Off Draw Works Compound, 126' Lee C. Moore Cantilever Mast on 6'-6" Substructure, 6400' 4"-14# Drill Pipe, 12—2¼" x 6¼" x 30' Drill Collars, Steel Doghouse, Bunk House, Complete Set of Tools and Accessories. Rig located in West Central Texas.

CENTURY CORPORATION

330 Fidelity Union Life Bldg.

RAndolph 8577, Dallas, Texas

USED EQUIPMENT

Model E Allis-Chalmers Skid Unit mounted on International Truck. Located Great Bend, Kansas.

Franks 7000 Single Drum Skid Swabbing Unit mounted on Dodge Tandem Truck. Located Odessa, Texas.

Franks SAL 4500 Skid Rotary Rig Cummins Power, 96' Derrick. Located, Tulsa, Oklahoma.

O.C.S. Type 3 Servicing Unit mounted on 1942 Mack Truck. Located Odessa, Texas.

Franks Super Senior Well Servicing unit 8 x 10 x 62 Single Pole Mast mounted on Tandem International Truck. Located Seminole, Oklahoma.

Write, wire or call Franks Mfg. Corporation, Box 3218, Whittier Station, Tulsa, Oklahoma.

FOR SALE EQUIPMENT

FOR SALE—Wichtex Model X5000 Spudder complete with tools and pipe. Contact Ekco Drilling Corp. Box 1167, Graham, Texas.

FOR SALE: ENGINE—165 Hp. Climax Model H61, maximum continuous Hp. rating 126. Herndon Drilling Company, 421 Mayo Building, Tulsa, Phone 4-9700.

FOR SALE, Failing 1500, Mayhew 1000, Franks FA, 2⅜" drill pipe, 2⅞" drill pipe, Sullivan 300. Box H-389, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE—At Oklahoma City warehouse 2400' 10¾" 19.42# new Armco Spiral Weld Line Pipe, 7/32" wall, beveled 30°, in 50' lengths. Price $1.85 Ft. Cities Service Oil Company. Patridge, Bartlesville, Oklahoma.

FOR SALE—At Oklahoma City warehouse, 10,000' New Republic 6⅝" OD 14.97#, electric weld line pipe, 30° beveled end, DPL, Grade "B". All or any part, $1.275 Ft. Cities Service Oil Company. Patridge, Bartlesville, Oklahoma.

FOR SALE: 96' Emsco Mast, 7½ x 12 G-D Pump with WAKU Waukesha, U-10 Unit Rig with (2) Gas Engines, 7¼ x 14 G-D Pump, Short Skids, 17½ FE Ideal Table, 54" Centers, Rebuilt Wilson "Giant" 2 engine rig drive, less engines, 5KW LeRoi Light Plant. For photos, detailed descriptions, prices, contact G. B. Pearson, J-S-G, Inc., 501 NE 26th, Okla. City. Jackson 5-6232.

FOR SALE: 2 H-600 Cummings Diesel Engines, good condition. Also large quantity of spare parts. 1 36-L Bucyrus-Erie Spudder complete with tools and lines. 3 years old. Good condition. 1 or 2 C-34 Walker-Neer Spudders complete with lines and tools. Less than one year old. Telephone 151, P. O. Box 1046, Shawnee, Oklahoma.

WE HAVE FOR SALE the following, pumping equipment located in Comanche County, Oklahoma. Twelve, #405 Bronze bushed Norris Jacks. One, #2 Durnell geared underpull pumping power with structural steel frame and corrugated iron housing. One 7½ H.P. motor. Line posts and ¼" steel cable. Leon Senter Petroleum Co., 307 Philtower Building, Tulsa, Oklahoma.

FOR SALE: Sullivan 200 complete with all tools ready to work. Located Tulsa, Okla. Contact R. F. Mesker, Phone 6-0057 or 5-9357, Tulsa.

2500 FT. 2⅜" used drill pipe. 1 Model 37 Joy Mfg. drill equipped with Failing automatic pull down, 4½ x 6 Gardner-Denver pump, 30 ft. mast, mounted on Ford Truck. Ainsworth, Inc., 1002 Union Nat'l. Bank Bldg., Wichita, Kansas, Fo-3-3785.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

PODBIELNIAK "Hydrobot" low temperature distillation apparatus; photoelectric spectrophotometer, Beckman model DU preferred; Freas or Dispatch forced-draft oven; misc. lab equipment. Box 1546, Brownsville, Texas.

WANTED: 126' or 127' Lee C. Moore Mast, National "75" Drawworks with or without rig drive, 7¼ x 10 G-D Pump only, Model U-34 or equivalent single engine drawworks, complete string tools 4000' work, trailer mounted equipment preferred. Submit offers G. B. Pearson, J-S-G, Inc., 501 NE 26th, Okla. City. Jackson 5-6232.

WANTED TANKCARS

Will purchase 10 to 20 cars if priced right.

PREFERABLY coiled, Class III, located in Gulf Area.

MUST BE 8000 gal., 50 ton trucks, have AB brakes, be in operating condition suitable I.C.C. interchange.

BOX H-382,

THE OIL AND GAS JOURNAL,

TULSA, OKLAHOMA.

HELP WANTED

SEISMIC INTERPRETERS by expanding contracting company for its new method. Minimum requirements, college degree in geophysics or related fields, and 5 years' experience in West Texas, Anadarko basin, or New Mexico. Houston location. All replies strictly confidential. P.O. Box 13148, Houston, Texas.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

SOUTH AMERICA. Major Oil Company. Our fee paid. Mechanical Engineer—Petroleum Engineer—Chemical Engineer—All requiring Degree, experienced or inexperienced. Geologist, single. Must have degree, some experience. Tool Pusher—under 40, three years' experience. Accountant—Degree, Accounting major, single. All information confidential. Contact CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma. Phone 4-3193.

DUE TO EXPANSION program large independent oil company has openings for assistants in seismic recording and computing. College graduates with at least one year of experience in geophysics desired. Ample opportunity for advancement. Give educational and previous employment details in initial letter and include photograph. All replies confidential. Box H-265, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Mathematical Analysis Group has openings for TWO mathematicians or physicists with advanced degrees and background in applied mathematics, numerical analysis and digital computing.

One position involves planning and supervision of numerical analysis and digital computing on reservoir engineering and petroleum production problems.

The other position involves mathematical analysis of refinery, pipe line, and exploration problems, including linear programming for optimum operations.

New laboratory building. Excellent benefits and working conditions. Address letter giving education, experience and salary requirement to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

EXPERIENCED SALES MANAGER WANTED

to organize sales division for a new oil field and pipeline unit. Must have experience with specialty salesmen and supply house contacts. Age 28 to 40 and capable of earning $25,000 per year.

Box H-346, The Oil and Gas Journal, Tulsa, Oklahoma

WANTED

DRILLING ENGINEERS

PRODUCTION ENGINEERS

For foreign employment by established oil well drilling contractor. Candidates must be graduate engineers of wide technical and practical experience. Salary dependent upon experience and qualifications. Please write, giving full personal history and employment record. Please include telephone number. All applications will be considered confidential.

Box H-355, The Oil and Gas Journal, Tulsa, Oklahoma

EXPLORATION MANAGER

Independent oil company has opening for experienced Exploration Manager, to direct exploration activities in Mid-Continent and Rocky Mountain Areas. Must be capable of handling all phases of land and geological operations, originating and closing deals, and directing division or district offices, between ages of 30 to 40, with major oil company training preferred. Unlimited opportunity for person qualified. In replying give past employment record, educational background, and full personal data.

BOX H-373,

THE OIL AND GAS JOURNAL,

TULSA, OKLAHOMA

HELP WANTED

EXPERIENCED Tank and Tubular Goods salesman with established contacts. Write Box H-360, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Distributor for Gas Lift Equipment in West Texas. Preferably Engineering or sales organization now operating in West Texas. Commission far above average. Macco Oil Tool Co. Inc., P. O. Box 7288, Houston 8, Texas.

WANTED—Graduate engineer, thoroughly experienced in all phases of core analysis work, by established commercial core laboratory. Profit participation for proven ability and loyalty. In reply, state qualifications and salary expected. Abilene Sample Log Service, P.O. Box 1939, Abilene, Texas.

GRADUATE CHEMICAL ENGINEER for work in research laboratory of major oil company; also Sales Engineer with degree in chemical or mechanical engineering and experienced in Liquefied Petroleum gas products sales and distribution. State experience and qualifications, Box 521, Tulsa, Oklahoma.

NATURAL GAS AND GASOLINE SUPERVISOR

Well established, growing oil Company needs man with broad general and technical experience in the field of natural gas operations. Company operations will include handling and delivering of various types of gas on a major scale from different fields.

Applicant must be thoroughly familiar with producing, gathering, treating, dehydrating and processing techniques and economics. Must also be capable of negotiating gas sales contracts and construction contracts.

Salary commensurate with knowledge and experience.

Forward applications, giving age, education, experience, expected salary and references to Mr. J. W. McKinnon, Hudson's Bay Oil and Gas Company Limited, 534–8th Avenue West, Calgary, Alberta, Canada. Applications will be held confidential, if desired.

EXPERIENCED MAN wanted to supervise construction and operation of natural gas transmission system in Southeastern Kentucky. Also desirable to have knowledge of natural gas production. State salary desired and qualifications. Box H-364, The Oil and Gas Journal, Tulsa, Oklahoma.

DRAFTSMEN for Eastern Products Line. Experienced in Mapping, Piping. Permanent position for right men. Located near Allentown, Pennsylvania. Reply should include age, resume of experience, education, references and salary requirements. P. O. Box 68, Emmaus, Pennsylvania.

WANTED FOR EMPLOYMENT

Petroleum Engineer, preferably recent graduate for Louisiana Gulf Coast work. Duties to require assistance in preparation of reservoir studies, evaluation and routine engineering reports. Work located in New Orleans with reliable and financially strong concern. Reply giving age, previous experience, if any, military status, and salary desired. Inquiries will be kept strictly confidential. Our employees know of this ad. Box H-381, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT for Independent Rocky Mountain operator, experienced in oil development, production, transportation and income tax. CPA preferred. Give full details of personal history, education, experience and earnings in initial reply. All replies confidential. Box H-377, The Oil and Gas Journal Tulsa, Oklahoma.

CHEMICAL ENGINEER WANTED

Houston Oil Refinery has opening for graduate Chemical Engineer with five or more years experience in the Petroleum Industry. Send complete resume to P. O. Box 5008, Harrisburg Station, Houston 12, Texas.

BUSINESS OPPORTUNITY

PRODUCER OF 60 profitable low cost motion pictures needs $140,000 to produce a popular adventure story full length in color. Money refunded from entire first returns plus 45% share. Tax ad. Low risk. W. P. Thomson, 465 Calif. St., San Francisco 4, EX 2-4050.

INVESTMENT GROUP has cash for producing properties, proven and semi-proven drilling deals. Submit full details. Box 46721, West Branch, 817 N. Hilldale Ave., Los Angeles 46, California.

HELP WANTED

OBSERVERS to operate and maintain advanced type equipment. Field experience and good electronic background essential. Do not apply unless fully qualified. P. O. Box 13148, Houston, Texas.

OIL CORPORATION

Stable and independent, expanding midcontinent and Rocky Mountains, seeks man with several years general oil experience to handle drilling contracts and to develop partial financing of drilling deals. Travel some. Attractive personality, sound judgment, age 25-40. Send picture, work resume, to Personnel Director, Builders, Inc., 352 N. Broadway, Wichita, Kansas.

HELP WANTED

CHEMICAL ENGINEER—with 2-4 years technical experience in petroleum refinery operations. Position in research and engineering department of chemical company in midwest area. Work invloves petroleum refining and fuel manufacturing relationships. Box H-372, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMOGRAPH PARTY CHIEF for small aggressive company. Minimum five years experience. Send transcript of college credits and brief outlining experience. Opportunities unlimited. Replies confidential. Box H-365, The Oil and Gas Journal, Tulsa, Oklahoma.

COMMONWEALTH OF AUSTRALIA
DEPARTMENT OF NATIONAL DEVELOPMENT
GEOLOGISTS AND GEOPHYSICISTS

are urgently required for work of national importance with the Bureau of Mineral Resources, Geology and Geophysics throughout Australia and its Territories.

The Geological Section is engaged in:—

(1) Geological prospecting for mineral deposits (including uranium and thorium), oil, coal, underground water, etc.
(2) Petrological, paleontological and geochemical investigations.
(3) Resident geological work in the Northern Territory and Papua-New Guinea.
(4) Miscellaneous geological field investigations including engineering geology.
(5) Preparation of detailed geological maps of Australia.

The Geophysical Section is engaged in:—

(1) Geophysical prospecting for metalliferous deposits, using electrical, magnetic and electromagnetic methods.
(2) Field radiometric surveys and laboratory investigations concerning the search for radio-active deposits.
(3) Geophysical prospecting for sedimentary deposits such as oil, coal and underground water, using principally (a) seismic and resistivity methods and (b) gravity and magnetic methods.
(4) Engineering geophysics, using seismic, magnetic, gravity, resistivity and other methods.
(5) Airborne magnetometer and scintillometer surveys using radar navigation.
(6) Operation of magnetic, ionospheric and seismological observatories.
(7) Regional magnetic and or regional gravity surveys.

Vacancies exist in the following grades of positions:—

	Salary Range (Aust.)
Asst. Chief Geologist	£1688 to £1874 p.a.
Supervising Geologist	£1564 to £1750 p.a.
Senior Geophysicist	£1352 to £1442 p.a.
Geologist, Grade 3)	
Geophysicist, Grade 3)	£1154 to £1262 p.a.
Geologist, Grade 2)	
Geophysicist, Grade 2)	£1106 to £1154 p.a.
Geologist, Grade 1)	
Geophysicist, Grade 1)	£ 818 to £1106 p.a.

Commencing salary may not necessarily be at the minimum salary stated, but will be determined upon the qualifications and experience of the successful applicant, e.g. a successful applicant for a Grade 1 position possessing an appropriate honours degree would commence at £962 per annum.

Travelling or camping allowances as appropriate are payable when on duty away from headquarters. In addition Geologists and Geophysicists while employed on ground survey duties in the field receive an allowance in lieu of overtime equal to 25% of salary. Geophysicists engaged on airborne surveys receive an allowance of 2/6d. per hour while flying.

Minimum Academic qualifications required are:—

(1) **Geologist:** A University degree, preferably with honours, or its equivalent, with all the subjects of Geology at third year standard; or such other qualifications and experience as are considered suitable.
(2) **Geophysicist:** A University degree, preferably with honours, or its equivalent, with a major (three year) pass in Geophysics, Physics, Geology, Mathematics or other appropriate subject; (e.g. Electronics; Electrical, Radio or Mining Engineering); Physics and Mathematics to second year standard and for certain positions Geology to first year standard or such other qualifications or experience as are considered suitable.

Applicants should specifically state the title and grade of position or positions for which they are applying and the section or sections of the Bureau's work in which they would prefer to take part. In addition applicants should state full name, date and place of birth and whether they are natural-born or naturalized British subjects. Copies only of references, testimonials or certificates should be forwarded.

Successful applicants will be paid salary from the date of embarkation at United States (or other overseas) port. Fares of the successful applicant and his family (if any) will also be paid subject to applicant completing appropriate bond of service.

The Geological Section is located at Canberra, and the Geophysical Section at Melbourne. Some positions of Geologist have headquarters at Darwin or Alice Springs (Northern Territory) or at Port Moresby or Rabaul (Papua-New Guinea). Some positions of Geophysicist have headquarters at Darwin or Port Moresby. Successful applicants appointed to positions with present headquarters at Melbourne will be required to transfer to Canberra at a later date.

District allowances are payable at the following rates:—

Alice Springs	£80 p.a. (married) £60 p.a. (single)
Darwin	£165 p.a. (married) £125 p.a. (single)
Papua-New Guinea	£200 p.a. (married) £150 p.a. (single)

Applications which close on Oct. 1, 1954, should be forwarded in duplicate to:—

The Consul-General
Australian Consulate-General
636 Fifth Ave.,
New York 20, N. Y.

CHIEF ENGINEER and MAINTENANCE SUPERINTENDENT

Resourceful man wanted with at least seven (7) years experience in petroleum refinery maintenance and engineering department, two (2) years of which should be in areas with fairly severe winter conditions. Supervisory experience necessary as well as knowledge of catalytic cracking and coking plant operations. M. E. Degree or equivalent required.

Salary commensurate with ability. Reply by letter giving complete resume of personal and work history.

GREAT NORTHERN OIL COMPANY
P. O. Box 3596 St. Paul, Minn.

SITUATIONS WANTED

ENGINEER, nine years varied drilling, work-over and oil and gas production experience in Rocky Mountains, desires change. Prefer responsible supervisory position. Box H-396, The Oil and Gas Journal, Tulsa, Oklahoma.

QUALIFIED, 46 YR. OLD man with 25 Yrs. major Company experience in drilling and production in Okla. and South Louisiana, Capable of taking complete charge of operations, desires connection with reliable independent. Box H-387, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINER—If high costs reduces profits, consult competent engineer for analysis of your operations. Box H-388, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN MATURE in years, experience and judgment wants connection with active organization, Houston area. Experienced oil field equipment management, oil marketing and various phases of industry. Valuable connections in these and allied lines. Direct inquiries to Box H-391, The Oil and Gas Journal, Tulsa, Oklahoma.

REGISTERED PETROLEUM ENGINEER. B.S. degree, married, age 44, 25 years experience, last 22 years with one Major Company as production engineer, supervisor of production, drilling, completing and responsible position in Area headquarters. Experienced in Mid-Continent operations, especially in high pressure Gulf Coast areas. Capable, good health, ambitious. Desire chance to improve advancement possibilities. Box H-390, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPELINE SUPERINTENDENT—B.S. Mechanical Engineering, B.S. Administration. Thorough experience in designing and installing automatic pump stations, piping layout, remote control equipment and operations. Thirteen years experience with major oil company. Under 40. Box H-348, The Oil and Gas Journal, Tulsa, Oklahoma.

M.S. IN CHEMISTRY, 28, married, ambitious, 5½ years varied operating experience: Gasoline, Sulfur, Girbotol Plants. Research, Laboratory organization. Technical papers published. Presently holding responsible position. Desires relocation with opportunity for advancement. Box H-351, The Oil and Gas Journal, Tulsa, Oklahoma.

GENERAL MANAGER or Field Superintendent with independent or individual. Petroleum Engineering degree, 10 years varied drilling, production and management experience. Salary or salary and interest. Box H-340, The Oil and Gas Journal, Tulsa, Oklahoma.

Well organized, well established oilwell drilling contractor desires the management and supervision of oil properties in West Texas, Central Texas, and New Mexico. Can provide complete handling of oil properties, from acquisition to production. No properties too small, and none too large to handle. Inquiries from independents, groups, small or medium sized oil companies invited. Write, wire, or call collect for further information.

MAKIN DRILLING COMPANY
P. O. Box 1626, Hobbs, New Mexico,
Phone 3-3141.
146 Allen Building, Midland, Texas,
Phone 2-2962.

SITUATIONS WANTED

GEOPHYSICAL SUPERVISOR, 17 years with major oil company, desires other connections. Seismograph experience, surveyor, observer, interpreter, party chief, supervisor. B.S. in Civil Engineering. Age 45. Rocky Mountain Region preferred. Box H-354, The Oil and Gas Journal, Tulsa, Oklahoma.

MINING GEOLOGIST—Ph.D., employed, would like to serve gas or oil company intending to enter the field of the rare and radioactive ores, either in a consulting capacity or full-time employment. References available. Box H-349, The Oil and Gas Journal, Tulsa, Oklahoma.

ASSIST OR MANAGE operations, exploration, drilling, development of oil properties. Experienced as Production Superintendent, Geological and Petroleum Engineer for major and independent oil companies. Box H-378, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY PROCESS ENGINEER: Chemical Engineering degree, 12 years diversified experience. Desire supervisory or engineering position in refinery or Petrochemical plant. Box H-383, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER, 33, 10 years varied Development, Design, Operational experience. Desire position with Texas Oil Company. Box H-384, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST-GEOLOGIST, 29, family, 6 years experience Rocky Mountain area. Desires position in exploration department of aggressive independent or major. Might assist geological consultants. Box H-376, The Oil and Gas Journal, Tulsa, Oklahoma.

REAL ESTATE

FOR SALE: Modern Air-Conditioned office building, suitable for medium size petroleum or allied firm. Equipment yard and garage with adequate parking facilities located in a desirable area of Tulsa. Box H-369, The Oil and Gas Journal, Tulsa, Oklahoma.

FISHING LODGE FOR SALE
Lake Bistineau—Bossier Parish, Louisiana
Cafe & Grocery Store Combined.
Large Summer Home.
10 Modern Cabins Furnished.
45 Plywood Rent Boats.
400' x 700' lot.
Rent Motors.
Boat House—30' x 80'.
3 Minnow Raising Ponds.
Deep Well Water.
All Modern Conveniences.
Excellent Fishing & Boating Spot.
G. C. GIBBS
P. O. Box 5164 Bossier City, La.

RANCH FOR SALE

4500 acre deeded ranch in Montana, one hour west of Billings. 300 cow capacity. 400 acres hay of which 250 acres is irrigated. 350 acres winter wheat. Two-year-old modern home, two fireplaces, six bedrooms, four baths, natural gas heat. Cabin on trout stream near house. School bus. Will sell with or without cattle and/or machinery. Inquiries invited.

A. J. HENRY
Columbus, Montana

REAL ESTATE

SOUTHERN CALIFORNIA HOME
For Sale: A fine home in Southern California, located in the City of Whittier, near Santa Fe Springs. Nine miles from Los Angeles. Custom built, finest construction throughout. French modern architecture. Ten rooms. Every modern convenience, including oval dining room, four bedrooms, playroom and beautiful tropical lanai. Spacious surroundings, barbecue, motor court, 3 car garage, semi tropical plantings. For brochure and further information address owner, 1237 N. Circle Drive, Whittier, California.

LEASE SERVICE

OIL LEASING TROUBLESHOOTER. My specialty is getting those holdout leases, filling in tough spots in a block, getting difficult title requirements. Box H-385, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

WISH TO BUY producing royalties. Box H-379, The Oil and Gas Journal, Tulsa, Oklahoma.

JACK EAGLE, Oil Properties, 706 City Nat'l Bldg., Oklahoma City, Oklahoma. Telephone REgent 6-7027.

OFFERING CHOICE PRODUCING oil income royalties with large reserves per Dollar investments. A. S. Berry, 522 Wright Bldg. Tulsa, Okla.

LEASE AND DRILLING BLOCKS

RESTRICTED PRIVATE OFFERING. Geophysical Company to drill shallow off-set well in West Texas on 65 acre tract between several producers. Undivided 1/32 Working Interest in well and tract for $765.00. Delivers oil in tank. No other costs. Deductible from this year's Income Taxes. Box H-375, The Oil and Gas Journal, Tulsa, Oklahoma.

11 BILLION FEET of gas reserves in new shallow sand development. Property is presently marketing million feet per day. Detailed information available to qualified parties interested in making a deal. Box 2, Clarendon, Penna.

YOU'LL GET shallow production on my structures near Cookeville, Tenn. 82 miles east of Nashville. The Knox dolomite and six other sands in the upper 1300 feet. N. M. Sauls, Cookeville, Tenn.

WILL BUY A ⅛ interest in a ⅞ drilling deal, either dry hole or turnkey, Texas, Okla., New Mex., La., Wyo., Kansas. No other states considered. Give full partic. No promoters. Box 22, Emmaus, Pa.

FOR SALE: Interests in oil producing properties in Shackelford County, Texas and in Dawson County, Texas. Box H-362, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCING Water Flood Property: Total 320 acres, one-third developed. Produced 25,000 bbls. last twelve months. $50,000.00 worth of operating equipment. Seven producing wells. For sale at bargain of $125,000.00. Contact Mr. Roger H. Davis, 220 Mercantile Commerce Building, Dallas, Texas.

Will pay cash instantly for lease (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

SHALLOW PRODUCTION: Want an oil or gas well drilled, see Carroll & Jones, Inc., cable tool drilling contractors (formerly Carroll Drilling Corporation) for leases, drilling deals, and water flood properties. Phone 4637, or write P.O. Box 655, Bowling Green, Kentucky.

FOR SALE: 320-acre lease, Chautauqua County, Kansas. One well producing eight barrels daily from Arbuckle lime. Contact Thos. C. Forbes, Eureka, Kansas.

SEE A. L. BOWLES, Box 947, Ada, Okla. for drilling deals and producing royalties if you have the cash for Oil Investments.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited
B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

BUSINESS SERVICE

Delaware Corporations formed and serviced, American Guaranty & Trust Company, P. O. Box 487, Wilmington, Delaware.

WANTED

GEOLOGIST WANTS SET of old Oklahoma scout tickets. Primarily interested NE Oklahoma. Box H-380, The Oil and Gas Journal, Tulsa, Oklahoma.

MAP CABINETS

END MAP-FILING WORRIES FOREVER! Kraftbilt Rollfiles keep rolled maps safe from dust, dampness, pilferers. Used by all major and hundreds of smaller oil companies. Send for Catalog 352-B. Ross-Martin Co., P. O. Box 800-A, Tulsa, Okla.

GAS MEASUREMENT SERVICES

GAS CHARTS INTEGRATED

SERVING CUSTOMERS IN 14 STATES. FAST RETURN SERVICE.

A sure and economical method of obtaining gas volume computations. Send one chart or 10,000. Write or 'phone for further information.

JOHN P. SQUIER CO.
P. O. Box 6100, Dallas 22, Texas
'phone Woodlawn-4484

Hagan Names Lipke, Duesing to New Posts

Gerald G. Lipke has been appointed manager of sales, standard products, for Hagan Corp., and John E. Duesing has been appointed sales manager of the Pittsburgh district office. These announcements were made by M. J. Boho, vice president and general manager of the Pittsburgh instrument and control manufacturing company.

Lipke was formerly sales manager of Hagan's Pittsburgh district sales office. He joined Hagan in 1936 as a service engineer with Hall Laboratories, Inc., a Hagan subsidiary.

Duesing joined the firm in 1939. His first position was that of an engineer with Hall Laboratories.

Oilwell Names Three To New Positions

Three promotions in U. S. Steel's Oil Well Supply Division have been announced recently. George B. White has been made district representative at Wichita Falls, Tex., according to William Miskimins, Central Midwest area manager. Ben A. Brooks, Jr., has been named city representative at New Orleans, according to M. F. Jones, manager of the Gulf Coast area, and Bernard E. Grey has been appointed field representative at Wooster, Ohio, according to C. H. Maynard, manager of the Eastern area.

White, formerly field representative at Pampa, Tex., joined Oilwell in 1950 at the division's Anson, Tex., store. He became field representative at Pampa in 1952.

Brooks joined Oilwell in 1948 in the merchandise department at the division's home office at Dallas. He subsequently served in the district inventory-control offices at Houston and Harvey, and he became field representative at the latter city early this year.

Grey joined Oilwell at its branch store at Newark, Ohio, in 1951, and since that time has held sales and managerial positions at Wooster and Zanesville, Ohio. Prior to his employment by Oilwell, he had 6 years' oilfield experience.

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LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that 26 parcels of land totaling 5113.90 acres within the known geologic structure of certain producing fields in Eddy and Lee Counties, New Mexico, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1:00 p. m., E.S.T., on October 15, 1954, when bids will be opened. Details of the lease offering, description of the lands, how and where to submit bids, and bid forms may be obtained from the Manager of the Land Office, Santa Fe, New Mexico, or from the Director, Bureau of Land Management, Washington 25, D. C. L. E. Hoffman, Chief, Division of Minerals.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that nine parcels of land totaling 1480 acres within the known geologic structure of Boone Dome Field in Natrona County, Wyoming, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1:00 p. m., E.S.T., on September 15, 1954, when bids will be opened. Details of the lease offering, description of the lands, how and where to submit bids, and bid forms may be obtained from the Manager of the Land Office, Cheyenne, Wyoming, or from the Director, Bureau of Land Management, Washington 25, D. C. L. E. Hoffman, Chief, Division of Minerals.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that 17 parcels of land totaling 6908.17 acres within the known geologic structure of Cedar Creek Field in Bowman County, North Dakota, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1:00 p. m., E.S.T., on October 27, 1954, when bids will be opened. Details of the lease offering, description of the lands, how and where to submit bids, and bid forms may be obtained from the Manager of the Land Office, Billings, Montana, or from the Director, Bureau of Land Management, Washington 25, D. C. L. E. Hoffman, Chief, Division of Minerals.

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LEDUC—4 Hi-500 Bbl. National Bolted Steel Tanks

1 6' x 20' "YIWP" 15# National Treater

1 2C, 2½' x 13' 125# National Separator

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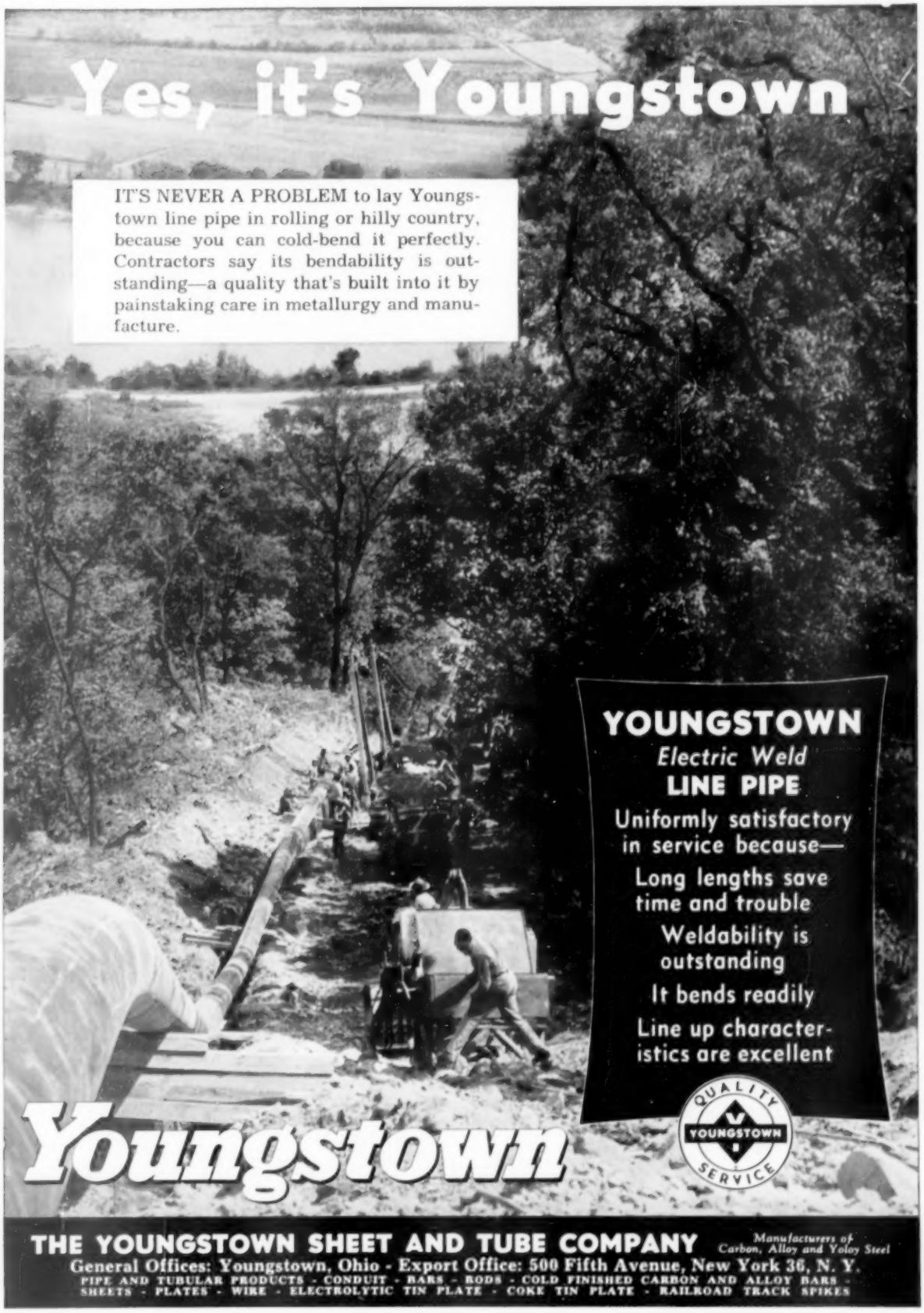
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